PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO

250

CONTENTS

TRADE NAME	MODEL	SET AND FOLDER NO.
Aircastle	738.5400, UL	250-2
Airline	GSE-1077A, GSE-1078A	250-3
Airline	25GHM-938A, 35GHM-938A	250-4
Bell Sound	PA3750-B, 3750-B	250-5
David Bogen	FC-1, FR-1, PS-1	250-6
Dewald	H-300 (UHF Conv.)	250-7
Emerson	788B (Ch. 120201B)	250-8
Firestone	13-G-134 (Code 105-4-82203) Tel. Rec.	250-9
Ford	4MF (FDA-18805-B-2)	250-10
General Electric	555, G, 556	250-11
Hallicrafters	611, 612	250-12
Hoffman	21B161, 21B331, 21B334, 21M160, 21M330, 21M333, 21P332 (Ch. 405-21, 406-21) Tel. Rec.	250-13
Mirrortone	Ch. 9048, 9050, 9053, 9054 Tel. Rec.	250-14
Mitchell	1276, 1277	250-15
Motorola	53H1, 53H2, 53H3, 53H4 (Ch. HS-337)	250-16
Packard	439279, 439310, 439661, 439665 Prod. Chg. Bul. 104	250-1
RCA Victor	SP-10 (MI-12190)	250-17
Silvertone	3054, 3055 (Ch. 132.056)	250-18
Sonora	335, 336	250-19
Sparton	5342, 5343, 5382, 5383, 5384, 5385, 5386, 5390, 5391 (Ch. 25D213) Tel. Rec. Prod. Chg. Bul. 104	250-1
Steelman	3A2	250-20
Sutco	37A (UHF Conv.)	250-21
Webcor	333-1, 333-2	250-22

The PHOTOFACT Servicer

Vol. 25, Nos. 249 & 250 ★ *Published for all users of Howard W. Sams' Photofact Folders* ★ June 15, 1954

PROPERTY OF
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The following information on the Alliance Tenna-Rotor Model F-4 is presented through the courtesy of Alliance Manufacturing Co., Alliance, Ohio.

GENERAL INFORMATION

The Alliance Tenna-Rotor, Model F-4 is actuated by turning a switch on the control box to the right or left. Turning the switch to the right rotates the antenna clockwise, and to the left rotates the antenna counter-clockwise. An indicator light comes on at the control box when the rotator reaches its full clockwise or counter-clockwise limits. This unit operates at a speed of two RPM, giving the operator an approximate direction indication, i.e., 15 seconds equal 180 degrees of rotation. In addition, a motor brake has been incorporated in this unit to prevent drifting and winding milling. The Model F-4 is identified by the black neoprene weather shield and the new style rotator housing.

SERVICING PROCEDURE

Power-off Checks

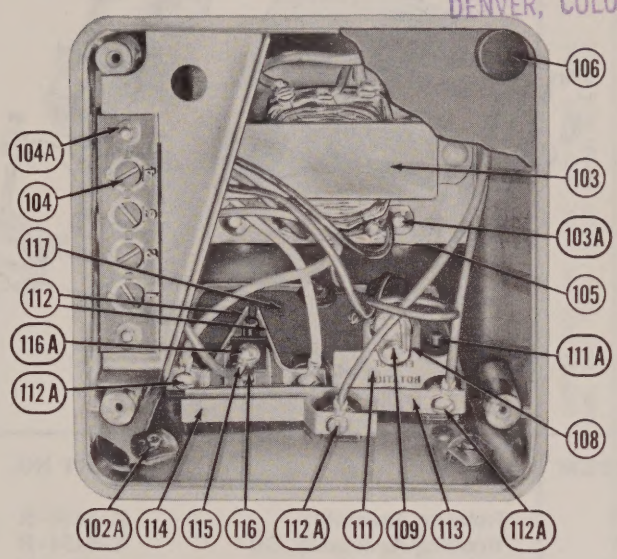
1. Be sure that four-conductor cable is connected to the proper terminals. Terminal No. 1 in the rotator should be connected to No. 1 on the control box, and so on with No's. 2, 3, and 4.

2. Hollow shaft (Item #4) must have "play".

3. Primary input contacts (Items #113 and 114) within the control box, should be .020 inch apart at neutral position and make solid contact for left and right positions.

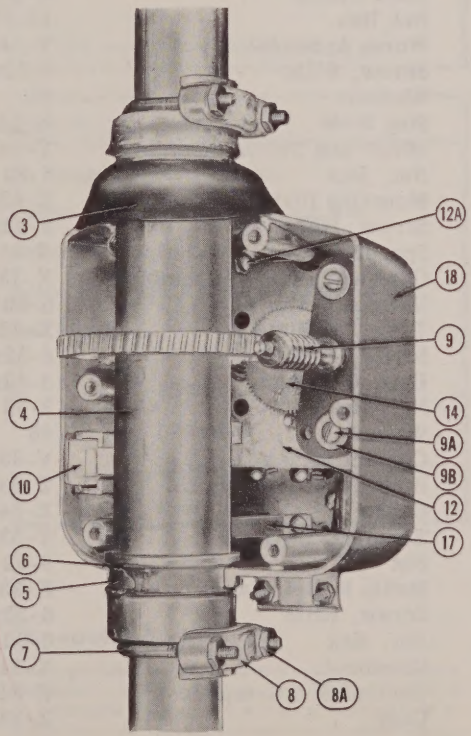
Power-on Checks

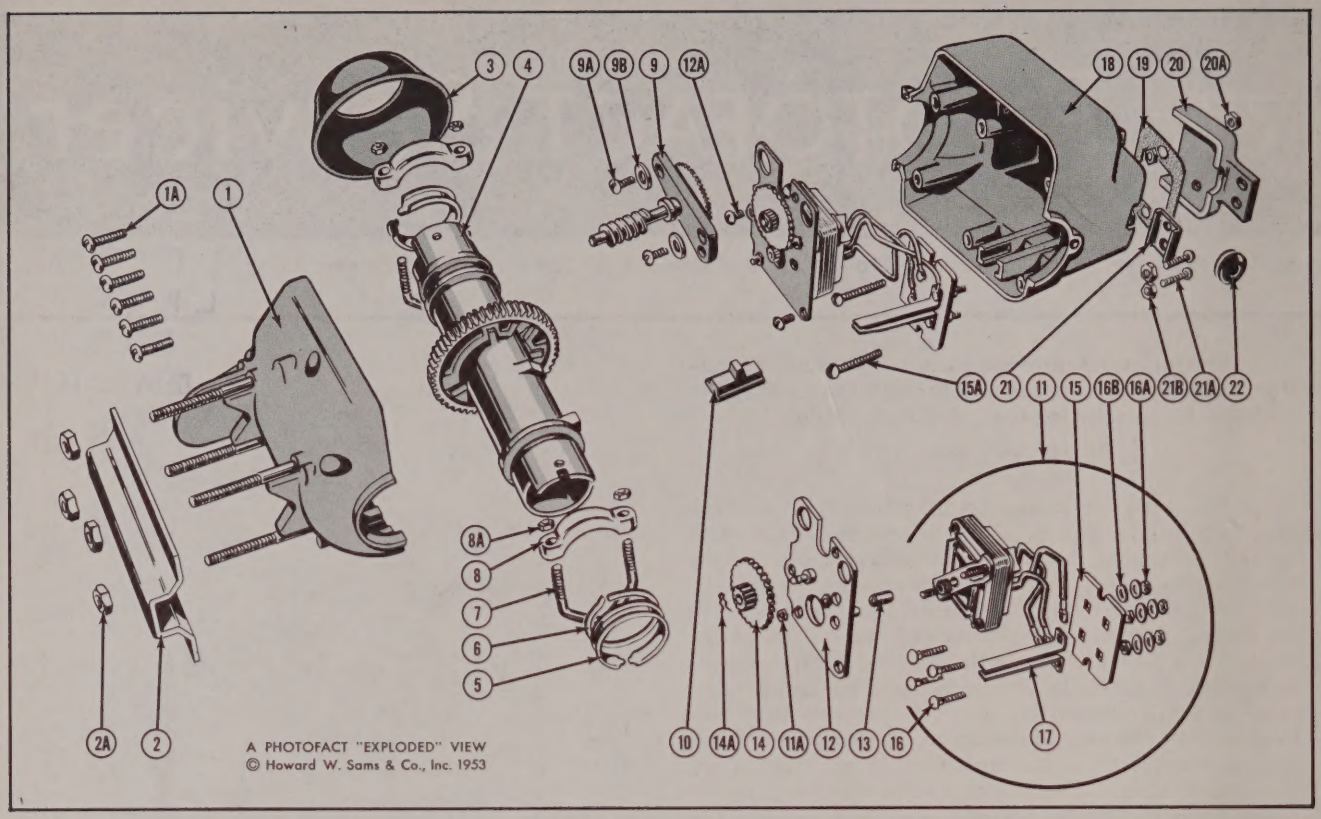
1. Line voltage should be approximately 115 volts.



2. Run unit to counter-clockwise stop by turning knob (Item #107) to the left. Light should come on when unit reaches stop.

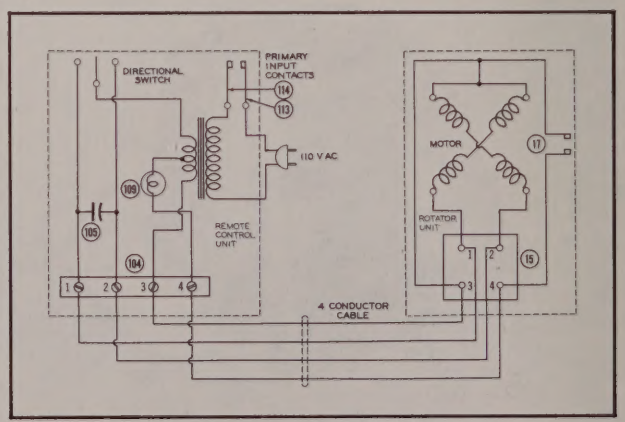
3. Run unit to clockwise stop by turning knob (Item #107) to right. Light should come on when unit reaches stop.





ITEM	NAME	PART NO.
	Rotator Assembly	Z-5450-R
1	Housing Assembly, RH	Y-5454-R
1A	Housing Screws	10-32x3/4
2	Clamping Plate	X-5456-A
2A	Nuts, Hex	1/4 x 20
3	Weather Shield	X-3375-A
4	Shaft Assembly	Y-5463-R
5	Bearing Collar	X-3987-A
6	Thrust Washer	X-3376-A
7	U-Bolt	X-3377-A
8	Mast Clamp	X-3319-A
8A	Nut, Hex	10-32
9	Worm Assembly	Y-5462-R
9A	Screw, RHM	8-32x3/8
9B	Washer	#8
10	Stop Slide	X-3320-A
11	Motor and Term Assembly	Y-5451-S
11A	Nut, Hex	6-32
12	Mounting Plate Assembly	X-4263-R
12A	Screw, RHM	8-32x1/4
13	Spacers	X-4141-A
14	Gear and Pinion Assembly	X-3373-R
14A	Hairpin Cotter	S-604-A
15	Terminal Plate	X-4253-A
15A	Screw, RHM	8-32x1"
16	Bolt, Carriage	8-32x5/8
16A	Nut, Hex	8-32
16B	Washer	#8
17	Contact Spring	Y-3358-A
18	Housing Assembly, LH	Z-5326-B
19	Gasket	X-5449-A
20	Terminal Cover	Y-5327-A
20A	Nut	8-32
21	Strain Relief Clamp	X-3380-A
21A	Screw, RHM	6-32x1/2
21B	Nut, Hex	6-32
22	Grommet	X-11-D
	Control Box Complete	Z-3466-S
101	Case	Z-3390-R

ITEM	NAME	PART NO.
101A	Screw, RHM	6-32x1/4
102	Front Panel Assembly	Y-3527-S
102A	Speed Nut	X-3459-A
103	Transformer	Y-4213-R
103A	Speed Nut	X-3459-D
104	Terminal Strip Assembly	X-3803-S
104A	Speed Nut	X-3459-E
105	Capacitor	X-4098-A
106	Bumper (feet)	X-3393-A
107	Knob	Y-3389-A
108	Bulb Socket Assembly	X-3392-R
109	Bulb (Type 46)	X-3395-A
110	Window	X-3396-A
111	Panel	X-3397-A
111A	Speed Nut	X-3459-B
112	Contact Spring	X-3451-A
113	Upper Main Spring Assembly	X-3457-R
114	Lower Main Spring Assembly	X-3458-R
115	Switch Plate	X-4174-A
116	Contact Lever	X-4175-A
116A	Screw, RHM	6-32x5/16
117	Front Panel (only)	Z-3388-A



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(PLEASE PRINT)

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STREET_____ ZONE_____

CITY_____

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PROPERTY OF
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DENVER, COLORADO

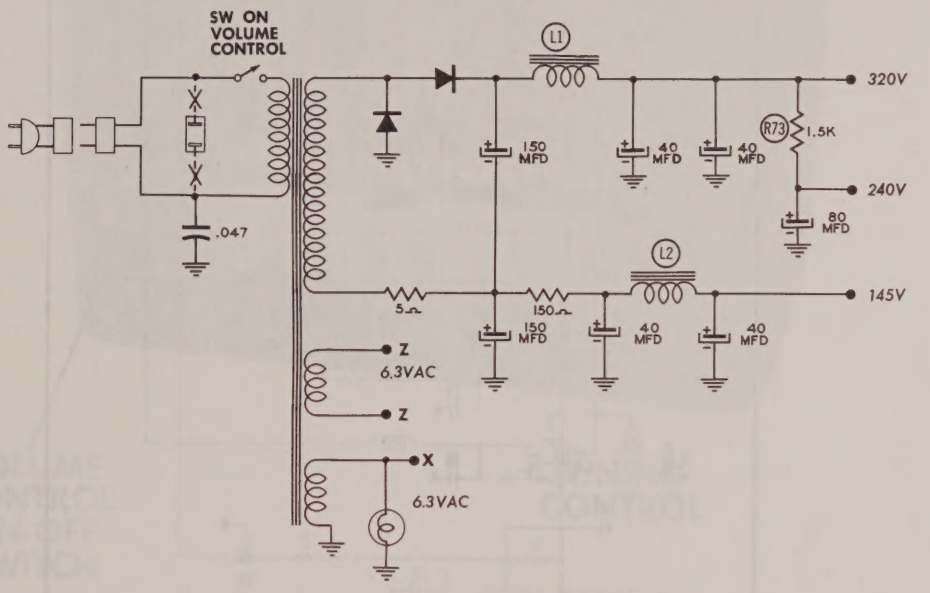
SUPPLEMENTAL DATA TO PHOTOFACT FOLDER 11 IN SET 210

SPARTON MODELS 5342, 5343, 5382, 5383, 5384, 5385, 5386, 5390, 5391 (Ch. 25D213)

Sparton models 5342, 5343, 5382, 5383, 5384, 5385, 5386, 5390, 5391 (Ch. 25D213) are identical to the models covered in Photofact Folder 11, Set 210, except for the following:

NEW POWER SUPPLY

A selenium rectifier low voltage power supply is used. When the selenium rectifiers are used the power transformer is changed to part #AB44029-1. A partial schematic is given below which shows the revised power supply circuit.



COMPONENT CHANGES

R50 was omitted. R51 was changed to 5.1KΩ and connected directly to the brightness and contrast controls (R3A and R3B).

R52 was omitted and no connections were made to 145 volts at this point.

NEW TUNER

A new tuner is used in Ch. 25D213. A schematic of this tuner is given on the reverse side.

(Con't on reverse side)

SUPPLEMENTAL DATA TO PHOTOFACT FOLDER 7 IN SET 160

PACKARD MODELS 439279, 439310, 439661, 439665

Packard auto radio model 416387 was covered in Photofact Folder 7, Set 160.

Models 439279 and 439310, for 1953, Series 26 autos, and 439661 and 439665, for 1954, Series 27 autos have since been added. These models are identical to model 416387, except for appearance items. A list of these items is given below. In addition, models 439661 and 439665 use a different volume - tone control and on/off switch (part number 7264720).

DESCRIPTION	PART NUMBER	NOTE
Fuse Holder	1220177	All Models
Escutcheon Assy.	7263693	Model 439279
Escutcheon Assy.	7263694	Model 439310

(Con't on reverse side)

PRODUCTION CHANGES
BULLETIN 104

PRODUCTION CHANGES
BULLETIN 104

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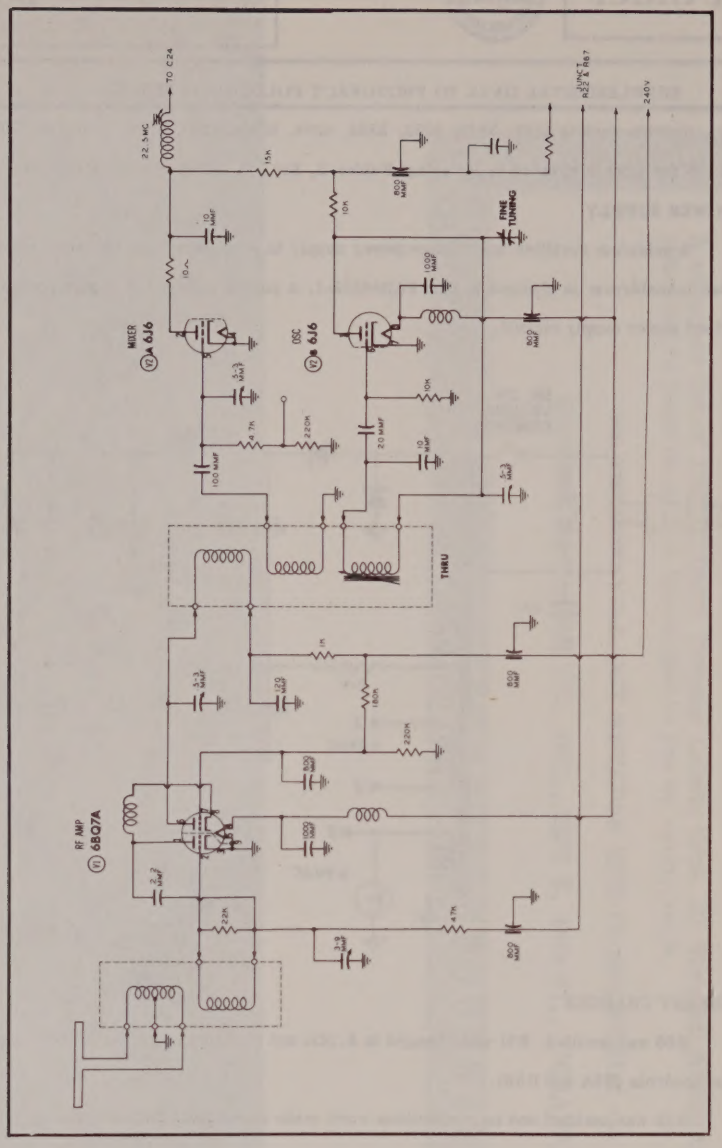

	Escutcheon Assy.	7264746	Model 439661
	Escutcheon Assy.	7264716	Model 439665
	Push Button & Slide Assy.	1220187	All Models
	Knob	7263495	Control Models 439310, 439661
	Knob	7264770	Control Model 439665
	Trimmer Plate	7263485	Control knob, All Models
	Lever	7263486	Tone Control, All Models

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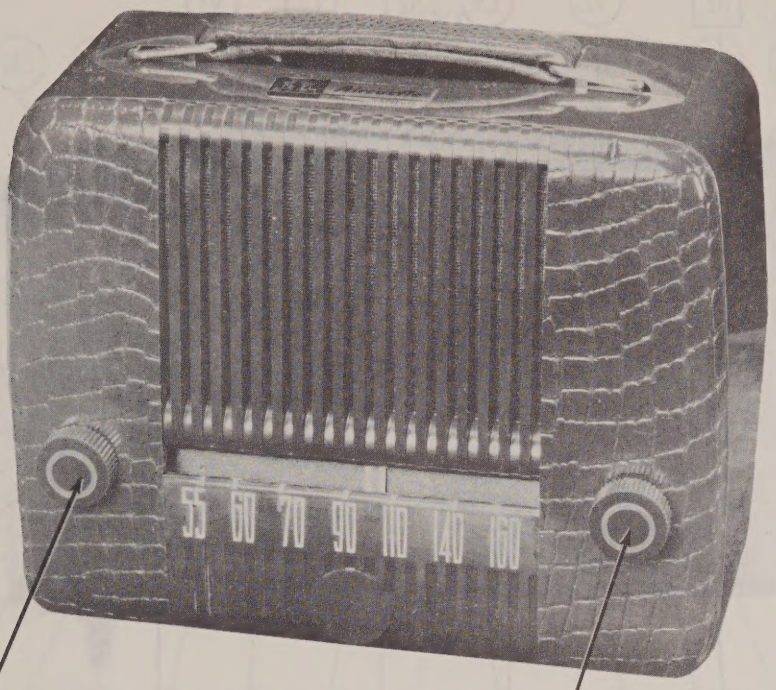
AIRCASTLE
MODELS 738.5400, UL



VOLUME CONTROL ON-OFF SWITCH

TUNING CONTROL

AIRCASTLE
MODELS 738.5400, UL

TRADE NAME	Aircastle Model 738. B5400, UL
SUPPLIER	Spiegel, Inc., 1061 W. 35th St., Chicago, Ill.
TYPE SET	Three Power Portable AM Superheterodyne Receiver
TUBES (Four)	Types 1R5 Conv., 1U4 IF Amp., 1U5 Det. -AVC-AF Amp., 3V4 Audio Output
POWER SUPPLY	110-120 Volts AC-DC (or) 4. 5 Volts "A" Supply & 90 Volts "B" Supply
RATING	.12 Amp. @ 117 Volts AC (or) 115MA @ 4. 5 Volts DC & 12MA @ 90 Volts DC
TUNING RANGE—BROADCAST	530-1700KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

With tuning gang fully closed set dial pointer at index mark on dial backplate.
Use battery power, if possible. If AC power is used, use an isolation transformer when available. If not, connect a .1MFD capacitor in series with low side of the signal generator and B-.
Volume control should be at maximum position. Output of signal generator should be no higher than necessary obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.01MFD	High side to antenna stator lug on tuning gang. Low side to B-	455KC (400~ Mod.)	Tuning gang fully open	Across voice coil	A1, A2, A3	Adjust for maximum output. If AC power is used without an isolation transformer, reduce dummy antenna to 200MMF to reduce hum modulation.
2.		Loop	1700KC	"	"	A4	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
3.		"	1400KC	"	"	A5	"

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PARTS LIST AND DESCRIPTIONS

AIRCASTLE
MODEL 738. B5400

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA		RETMA BASE TYPE	NOTES
		AIRCASTLE PART No.	STANDARD REPLACEMENT		
V1	Converter	1R5	1R5	7AT	
V2	IF Amplifier	1U4	1U4	6AR	
V3	Det-AF-Amp.	1U5	1U5	6BW	
V4	Audio Output	3V4	3V4	6BX	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	AIRCASTLE PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C1A	80	150	1229-P							Red
B	40	150								Yellow
C	50	10								Blue
D	10	10								Green
C2	.05	400	C-5030	P488-05	DF-503	CUB4S5		PT415	4TM-S5	
C3	30		C-5031	SI30	D6-300		GP1K-300		5GA-Q3	
C4	.01	400	C-5028	P488-01	D6-103	CUB4S1	GP2-333-103	PT411	4TM-S1	
C5	.02	400	C-5029	P488-02		CUB4S2		PT412	4TM-S2	
C6	250		C-5033	SI250	D6-251	TP40	GP2K-251	UC-5325	5GA-T25	
C7	.01	400	C-5028	P488-01	D6-103	CUB4S1	GP2-333-102	PT411	4TM-S1	
C8	.05	400	C-5030	P488-05	DF-503	CUB4S5		PT415	4TM-S5	
C9	.01	400	C-5028	P488-01	D6-103	CUB4S1	GP2-333-103	PT411	4TM-S1	
C10	30		C-5031	SI30	D6-300		GP1K-300		5GA-Q3	
C11	250		C-5033	SI250	D6-251	TP40	GP2K-251	UC-5325	5GA-T25	
C12	.05	400	C-5030	489ZX-05	DF-503	PJ4S5		PT415	4TM-S5	
C13	.05	400	C-5030	PT415	DF-503	CUB4S5		PT 415	4TM-S5	

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	AIRCASTLE PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	
R1A	2 Meg	½	C-1807-1	Q13-139	A47-2 Meg-Z	AB-76	U-55	Volume
B	Shaft		Not Req.	Not Req.	KSS-3	AK-4	Not Req.	Attach to R1A
C	Switch		Not Req.	76-2	SWE-20	KB-2	US-27	Attach to R1A

RESISTORS

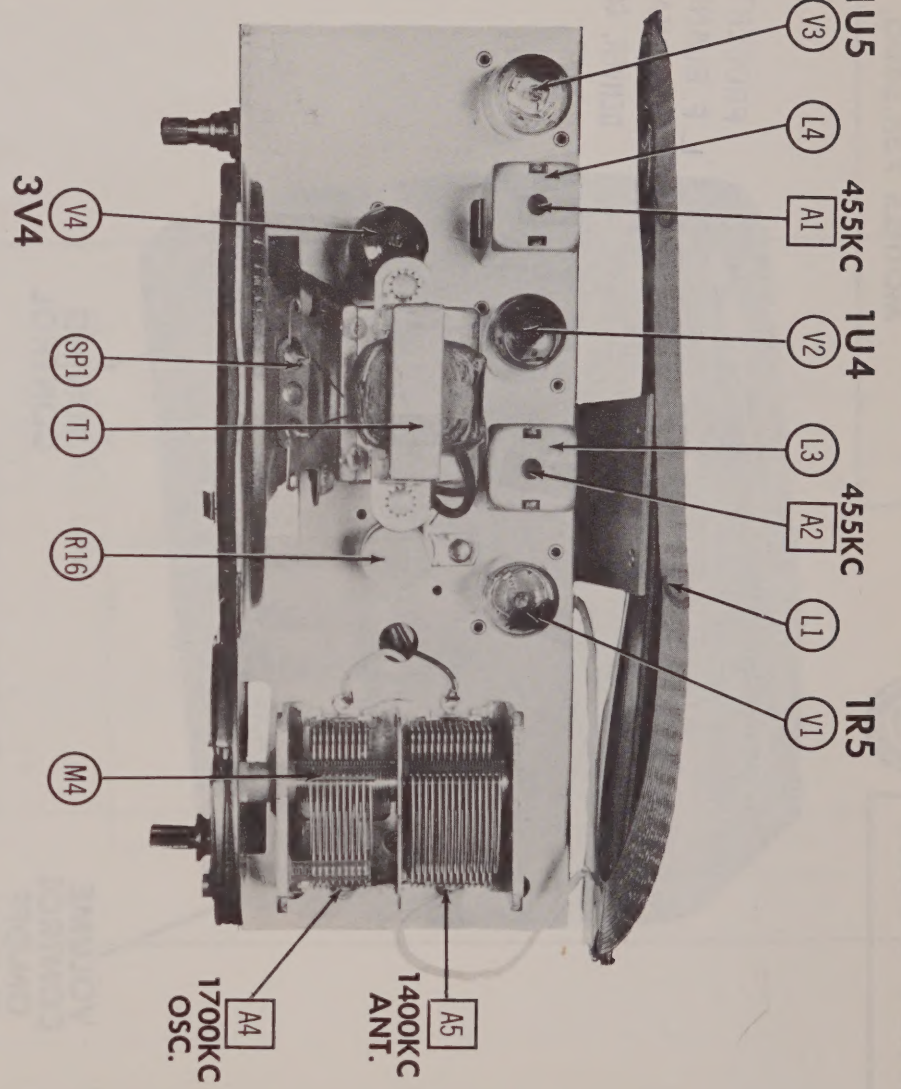
ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	AIRCASTLE PART No.	IRC PART No.	
R2	6.8Meg	½	C-5026	BTS-6.8Meg	
R3	56KΩ	½	C-1226P	BTS-56K	
R4	2.2Meg	½	C-5021	BTS-2.2Meg	
R5	47KΩ	½	C-1225	BTS-47K	
R6	6800Ω	½	C-1829	BTS-6800	
R7	2.2Meg	½	C-5021	BTS-2.2Meg	
R8	330KΩ	½	C-1227	BTS-330K	
R9	6.8Meg	½	C-5026	BTS-6.8Meg	

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	AIRCASTLE PART No.	IRC PART No.	
R10	2.2Meg	½	C-5021	BTS-2.2Meg	
R11	470KΩ	½	C-1228	BTS-470K	
R12	2.2Meg	½	C-5021	BTS-2.2Meg	
R13	680Ω	½	C-1832	BTS-680	
R14	27Ω	½	C-1233	BTS-27	
R15	1500Ω	1	C-5019	BTA-1500	
R16	2250Ω	7	C-1831	1 3/4A-2250	
R17	100Ω	1	C-1224P	BTA-100	

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	AIRCASTLE PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Halldorson PART No.	Thordarson PART No.	
T1	9.8KΩ	3.4Ω		A-3329	A-2927	S-11X	Z1110	TS-24S49	

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

SPEAKER

ITEM No.	RATINGS			REPLACEMENT DATA			NOTES
	SIZE	FIELD	V. C. IMP.	AIRCASTLE PART No.	JENSEN PART No.	QUAM PART No.	
SP1	4"	PM	3.4Ω	C-1806	ST-113 Mod. P4-X	4A1	

COILS (RF-IF)

ITEM No.	USE	DC RES.		REPLACEMENT DATA				NOTES
		PRI.	SEC.	AIRCASTLE PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L1	Loop Ant.	2.9Ω		C-1814				
L2	Osc. Coil	.8Ω	5Ω	C-5013P	14-1074	BC-381 *	70-Osc.	
L3	Input IF	23Ω	23Ω	C-1803	16-6758	BC-352	12-C1	
L4	Output IF	32Ω	22Ω	C-1803-1	16-6758	BC-353	12-C2	

* Drill mounting hole.

SELENIUM RECTIFIER

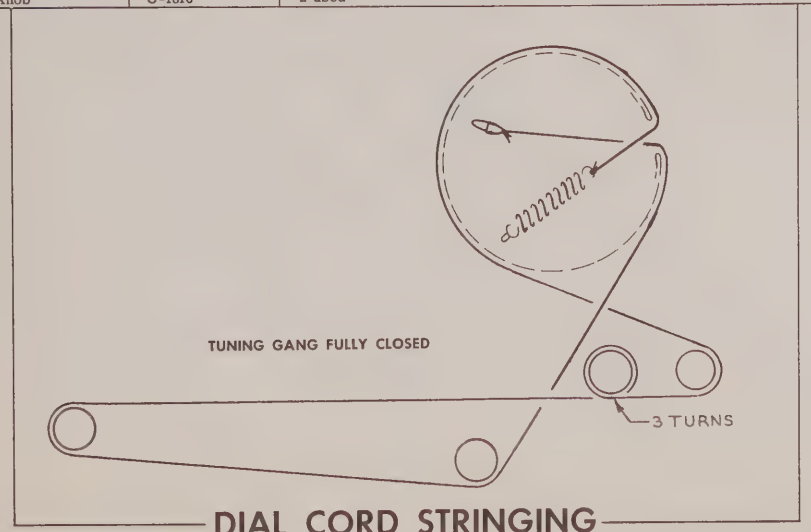
ITEM No.	RATING	REPLACEMENT DATA						NOTES
	CURRENT	AIRCASTLE PART No.	FEDERAL PART No.	INTERNATIONAL PART No.	MALLORY PART No.	SARKES TARZIAN PART No.	SELETRON PART No.	
M1	.062A	1813	1263A	RS65	6S65	65	8J1	

BATTERIES

ITEM No.	VOLTAGE	AIRCASTLE PART No.	REPLACEMENT DATA						INSTALLATION NOTES
			EVEREADY			BURGESS			
			"A"	"B"	"A-B"	"A"	"B"	"A-B"	
M2	4.5V		726			D3			
M3	90V			490			N60		

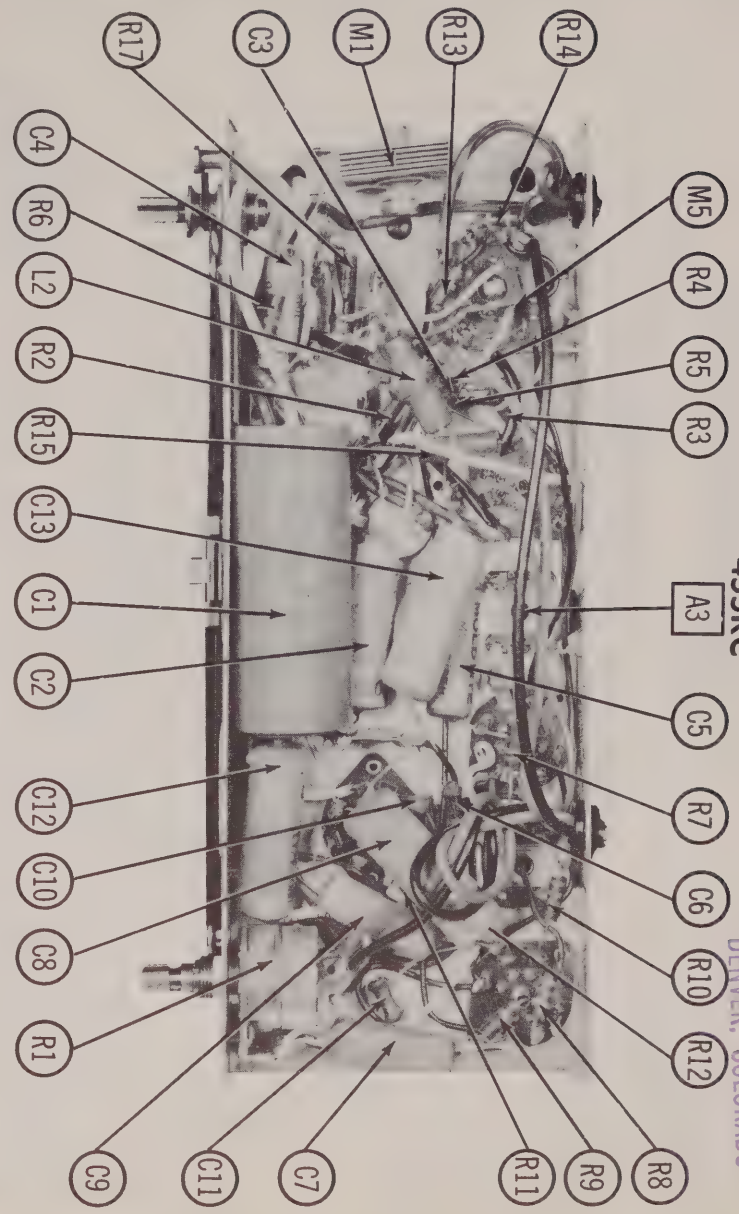
MISCELLANEOUS

ITEM No.	PART NAME	AIRCASTLE PART No.	NOTES
M4	Tuning cap	1802	(41-477MMF, 23-180MMF)
M5	Switch	C-1808-2	Power changeover
	Cabinet	C-1815	
	Back	C-1815-1	
	Knob	C-1816	2 used



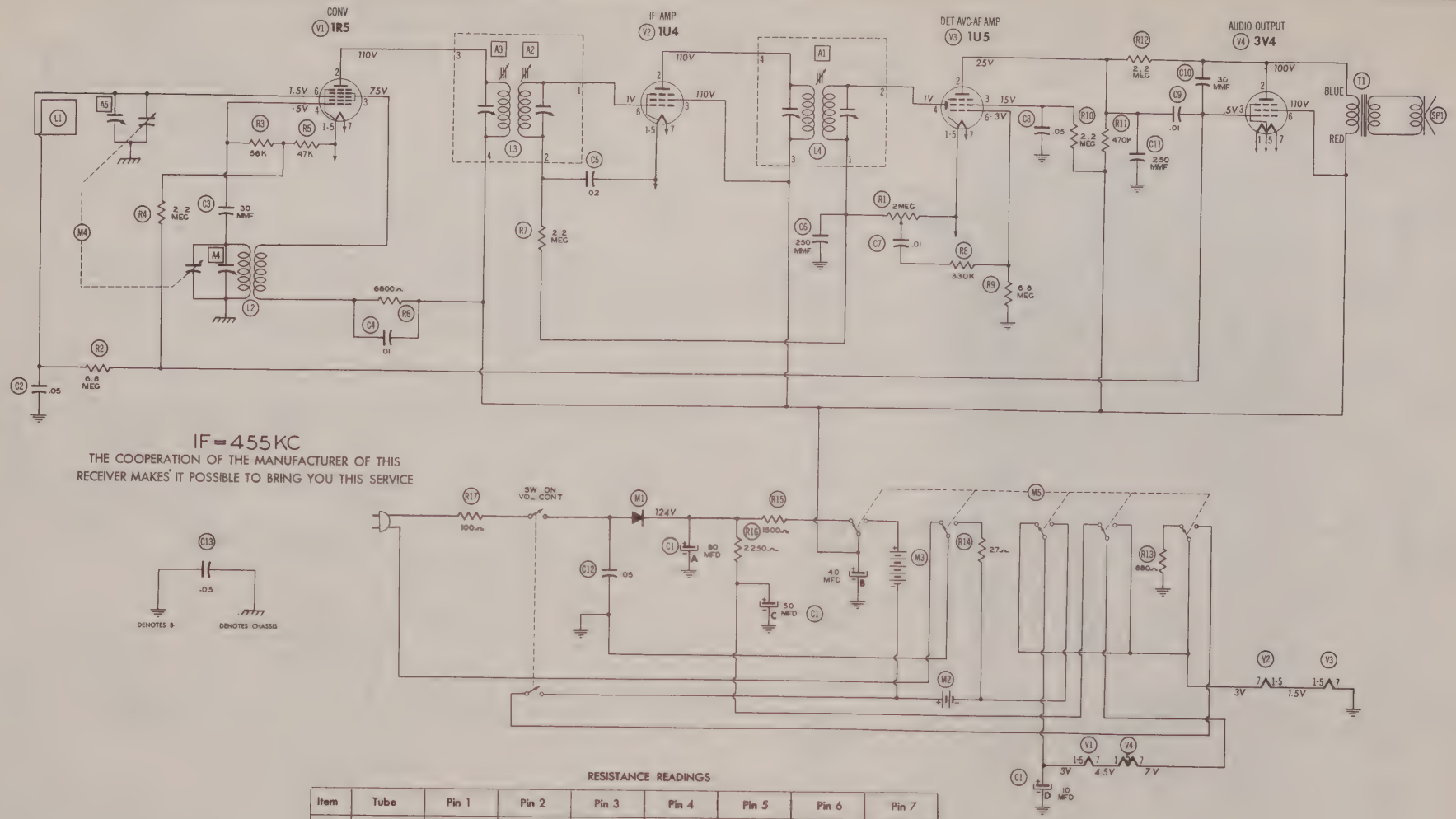
DIAL CORD STRINGING

CHASSIS—BOTTOM VIEW



AIRCASTLE
MODEL 738. B5400

AIRCASTLE
MODEL 738. B5400



RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V 1	1R5	*	† 1.5KΩ	† 8.3KΩ	100KΩ	*	6.9Meg	*
V 2	1U4	*	† 1.5KΩ	† 1.5KΩ	INF	*	4.2Meg	*
V 3	1U5	*	† 470KΩ	† 2.2Meg	2 Meg	6.8Meg	7 Meg	0Ω
V 4	3V4	*	† 1.9KΩ	† 1.5KΩ	INF	*	100KΩ	*

† MEASURED FROM OUTPUT OF M1.
* DO NOT USE OHMMETER TO MEASURE FILAMENT RESISTANCE.

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

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3924 MEADE ST.
DENVER, COLORADO

AIRLINE
MODELS GSE-1077A, GSE-1078A

AIRLINE
MODELS GSE-1077A, GSE-1078A

TRADE NAME	Airline Models GSE-1077A, GSE-1078A
SUPPLIER	Montgomery Ward & Co., 619 Chicago Ave., Chicago, Ill.
TYPE SET	Three Power Portable AM Superheterodyne Receiver
TUBES (Four)	Types 1R5 Conv., 1U4 IF Amp., 1U5 Det. -AVC-AF Amp., 3V4 Audio Output
POWER SUPPLY	110-120 Volts AC-DC (or) 3 Volts "A" Supply & 67½ Volts "B" Supply
RATINGS	.15 Amp. @ 117 Volts AC (or) 150MA @ 3 Volts DC & 11MA @ 67½ Volts DC
TUNING RANGE—BROADCAST	530-1650KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.
Use battery power, if possible. If AC power is used, use an isolation transformer when available. If not, connect a .1MFD capacitor in series with low side of the signal generator and B-.
Shield must be mounted on chassis when performing steps 2 and 3.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.2MFD	High side to Pin 6 (grid) of 1R5 (V1). Low side to B-.	455KC (400~ Mod.)	Tuning gang fully open.	Across voice coil	A1, A2, A3, A4	Adjust for maximum output. IF AC power is used without an isolation transformer, reduce dummy antenna to 200MMF to reduce hum modulation.
2.		Loop	1650KC	"	"	A5	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
3.		"	1400KC	Tune to 1400KC signal	"	A6	"

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PARTS LIST AND DESCRIPTIONS

AIRLINE MODEL GSE-1077A

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA		RETMA BASE TYPE	NOTES
		AIRLINE PART No.	STANDARD REPLACEMENT		
V1	Converter	1R5	1R5	7AT	
V2	IF Amplifier	1U4	1U4	6AR	
V3	Det-AVC-AF Amp.	1U5	1U5	6BW	
V4	Output	3V4	3V4	6AX	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	AIRLINE PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C1A	40	150	MW25E72	PRS106D20A		BBRT5315-			TVA-3427	Yellow
B	40	150				C10				Red
C	100	10								Green
C2	.047	200	MW23E3214	P288-047	DF-503	PJ2S47		PT4147	2TM-S47	
C3	100			SI150N750	TCN-101	N042	N750M-101	NT-531	5TCU-T1	
C4	.1	200	MW23E2043-9	P288-1	DF-104	PJ2P1		PT401	2TM-P1	
C5	10000		MW23E2025-4	BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C6	.22	100	MW23E2043-3							
C7A	150						GP1K-151	UC-5315		
B	2000						801-002	DC-522		
C	10000		♦ MW23E2041-8	♦ PA-250	♦ PC-166		811-01	DC-511		
D	150						GP1K-151	UC-5315		
E	50000						801-005	DC-525		
C8	5000		MW23E2025	BPD-005	DD-502	K080	801-005	DC-525	5HK-D5	
C9	20000		MW23E2037-7	BPD-02	DF-203	K085			5HK-D2	
C10	.1	400	MW23E3416	P488-1	DF-104	CUB4P1		PT411	4TM-P1	

♦ Items C7A, C7B, C7C, C7D, C7E, R13A, R13B, R13C and R13D combined in one unit.

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	AIRLINE PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	
R1A	2 Meg	½	28E98	Q13-139	A47-2Meg-Z	B-76-S	U-55	Volume
B	Shaft		Not Req.	Not Req.	FS-3	Not Req.	Not Req.	Attach to R1A
C	Switch		Not Req.	76-2	SWE-20	Not Req.	US-27	Attach to R1A

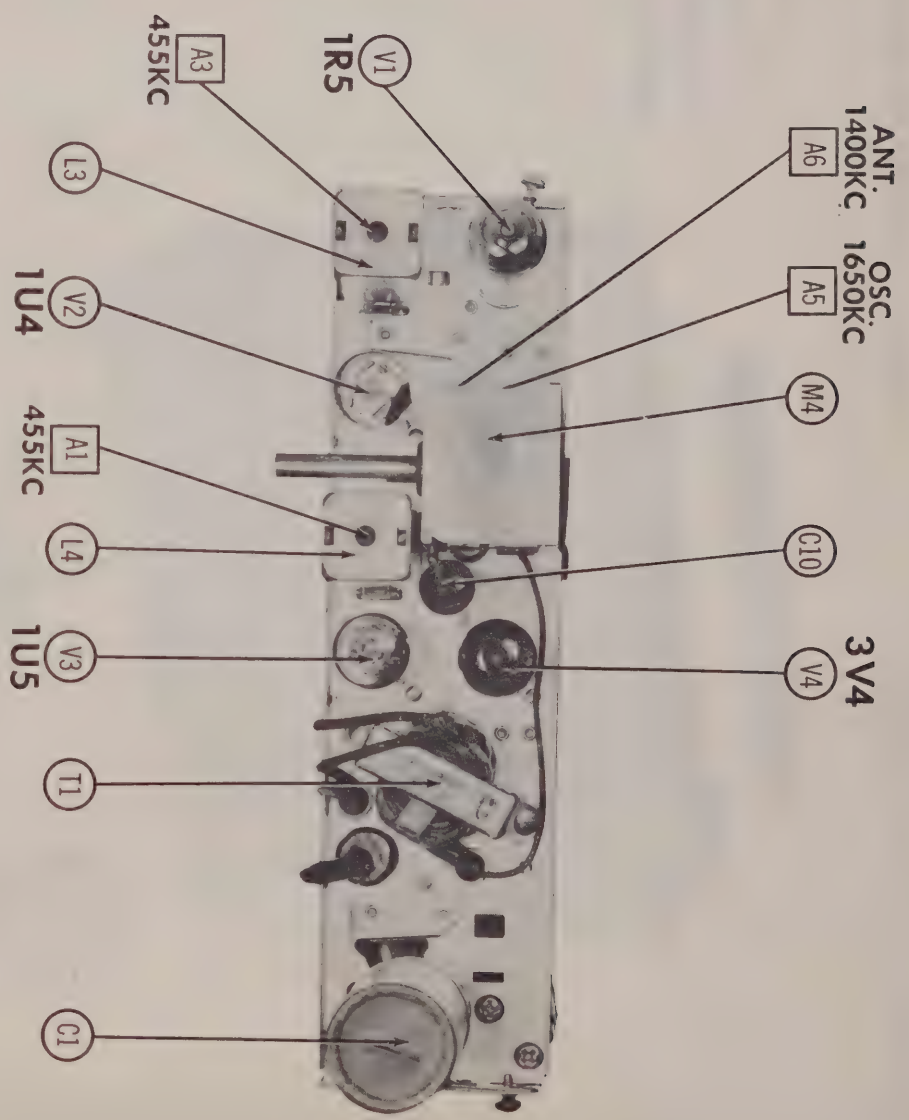
RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	AIRLINE PART No.	IRC PART No.	
R2	68KΩ	½		BTS-68K	
R3	6800Ω	½		BTS-6800	
R4	470KΩ	½		BTS-470K	
R5	680Ω	½		BTS-680	
R6	1 Meg	½		BTS-1 Meg	
R7	680Ω	½		BTS-680	
R8	4.7Meg	½		BTS-4.7Meg	
R9	4.7Meg	½		BTS-4.7Meg	
R10	270Ω	½		BTS-270	
R11	330Ω	½		BTS-330	

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	AIRLINE PART No.	IRC PART No.	
R12	220KΩ	½		BTS-220K	
R13A	4.7Meg	½		BTS-4.7Meg	
B	4.7Meg	½		BTS-4.7Meg	
C	1 Meg	½	♦MW23E2041-8	BTS-1 Meg	
D	2.2 Meg	½		BTS-2.2Meg	
R14	270Ω	½		BTS-270	
R15	27Ω	½		BTS-27	
R16	2700Ω	1		BTA-2700	
R17	2300Ω	6	MW27E1025		
R18	68Ω	1	MW27E1024		

♦ Items R13A, R13B, R13C, R13D, C7A, C7B, C7C, C7D, C7E are combined in one unit.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE PRI.	IMPEDANCE SEC.	REPLACEMENT DATA: AIRLINE PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Halldorson PART No.	Thordarson PART No.	NOTES
T1	9.8KΩ	3.5Ω	22E87	A-3329	A-2998 ②	S-11X	Z1117 ①	TS-24S60 ①	① Drill one new mounting hole. ② Use 10KΩ pri. tap.

SPEAKER

ITEM No.	RATINGS SIZE	RATINGS FIELD	RATINGS V. C. IMP.	REPLACEMENT DATA: AIRLINE PART No.	VIKING PART No.	QUAM PART No.	NOTES
SP1	3½"	PM	3.5Ω	1E53-2	35J4	3A07	

COILS (RF-IF)

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA: AIRLINE PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	NOTES
L1	Ant. Coil	.9Ω		MW64E37				
L2	Osc. Coil	2.4Ω	10Ω	MW20E837	14-1074		70-Osc.	
L3	Input IF	20Ω	20Ω	MW20E825	16-6758	BC-352	12-C1	
L4	Output IF	20Ω	20Ω	MW20E825	16-6758	BC-353	12-C2	

SELENIUM RECTIFIER

ITEM No.	RATING CURRENT	REPLACEMENT DATA: AIRLINE PART No.	FEDERAL PART No.	INTERNATIONAL PART No.	MALLORY PART No.	SARKES TARZIAN PART No.	SELETRON PART No.	NOTES
M1	.066A	57E15	1003	RS75	6S75	75	5M4	

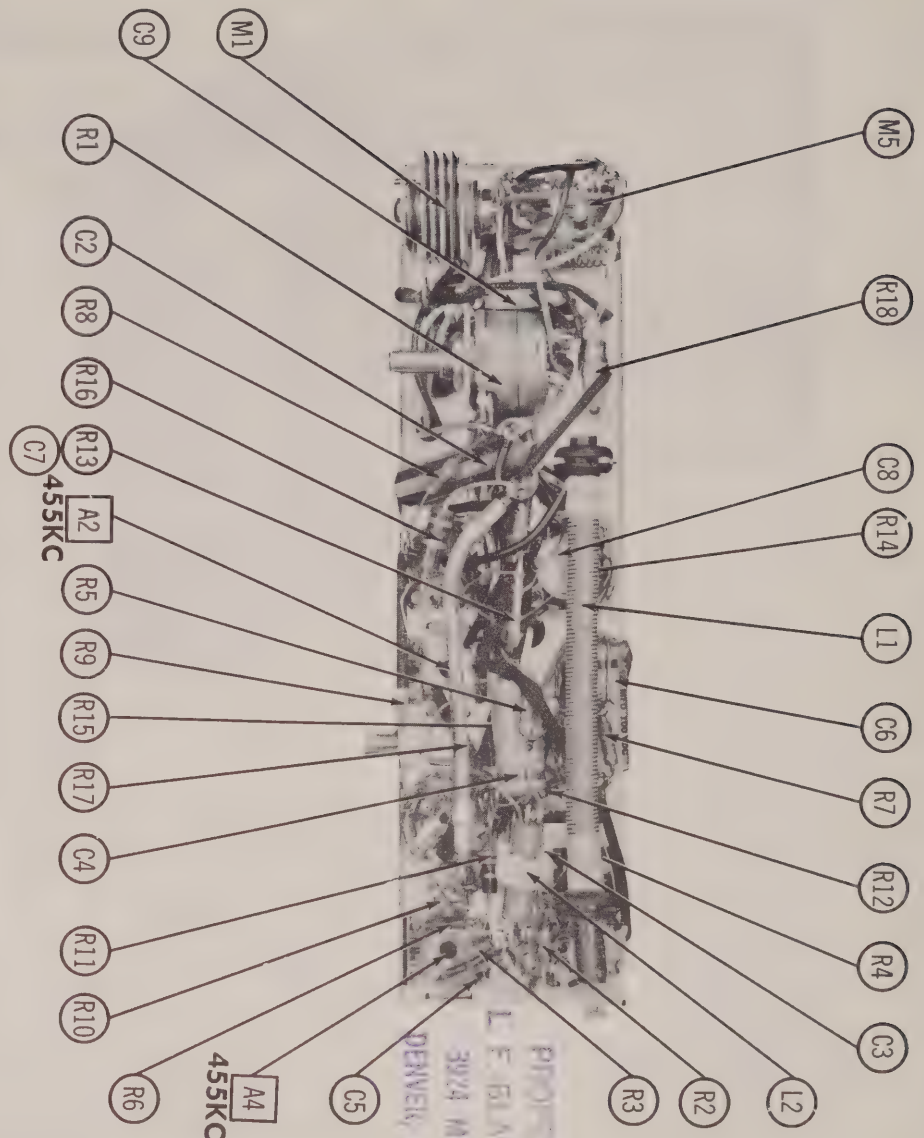
BATTERIES

ITEM No.	VOLTAGE	AIRLINE PART No.	REPLACEMENT DATA: EVEREADY "A"	EVEREADY "B"	EVEREADY "A-B"	BURGESS "A"	BURGESS "B"	BURGESS "A-B"	INSTALLATION NOTES
M2	1½"A"	62B-23A	950			2R			2 used in series
M3	67½	62B-40B		477			P45		

MISCELLANEOUS

ITEM No.	PART NAME	AIRLINE PART No.	NOTES
M4	Tuning cap	MW24E62	2 section (23-225MMF, 16-115MMF)
M5	Switch	MW29E20	Power changeover
	Cabinet	MW20E911	Green
	Cabinet	MW20E911-2	Rust
	Knob	MW37E82-2	Volume
	Dial	MW35E33-2	Tuning

CHASSIS—BOTTOM VIEW



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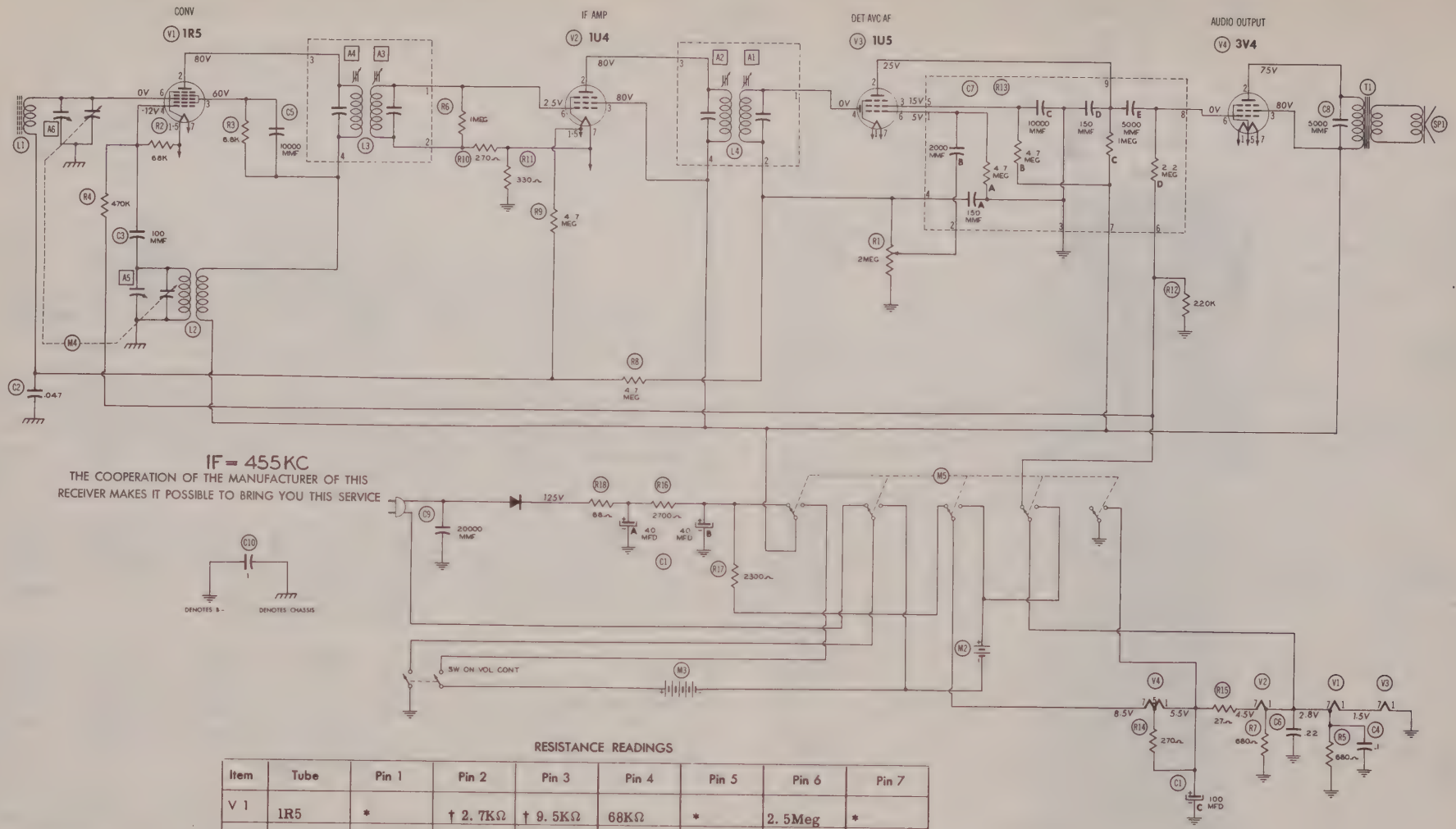
AIRLINE
MODEL GSE-1077A



RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V 1	1R5	*	† 2. 7KΩ	† 9. 5KΩ	68KΩ	*	2. 5Meg	*
V 2	1U4	*	† 2. 7KΩ	† 2. 7KΩ	0Ω	*	330Ω	*
V 3	1U5	*	† 1 Meg	† 4. 7Meg	1. 5 Meg	2. 5Meg	4. 7Meg	*
V 4	3V4	*	† 3. 3KΩ	† 2. 7KΩ	INF	*	2. 2Meg	*

1. DC voltage measurements taken with vacuum tube voltmeter, AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 10% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

† MEASURED FROM OUTPUT OF M1.
* DO NOT USE OHMMETER TO MEASURE FILAMENT RESISTANCE.

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AIRLINE
MODELS 25GHM-938A, 35GHM-938A

AIRLINE
MODELS 25GHM-938A, 35GHM-938A

TRADE NAME	Airline Models 25GHM-938A, 35GHM-938A
SUPPLIER	Montgomery Ward & Co., 619 Chicago Ave., Chicago, Ill.
TYPE SET	AC Operated Phono Amplifier With 3 Speed Manual Record Player
TUBES (Three)	Types 6C4 AF Amp., 50C5 Audio Output, 35W4 Rectifier
POWER SUPPLY	110-120 Volts AC-60 Cycles RATING .25 Amp. @ 117 Volts AC

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PARTS LIST AND DESCRIPTIONS

AIRLINE
MODEL 25GHM-938A

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA		RETMA BASE TYPE	NOTES
		AIRLINE PART No.	STANDARD REPLACEMENT		
V1	Phono Pre-Amp.	6C4	6C4	6BG	
V2	Phono Output	50C5	50C5	7CV	
V3	Rectifier	35W4	35W4	5BQ	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	AIRLINE PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C1A	▲40	150		AFH4-28		D085		FP409	TVL-4420	
B	■40	150								Note 1
C	▲20	25								Note 1
D	20	25								
C2	5000		38X125	BPD-005	DD-502	TM5D5	812-005	DC-525	5HK-D5	
C3	.1	200	D-104	P288-1		PJ2P1		PT401	2TM-P1	
C4	.01	200	D-103	P288-01		PJ2S1		PT411	2TM-S1	
C5	.02	400		P488-02	DD-203	PTE4S2		PT412	4TM-S2	Note 2
C6	.05	400	E-503	P488-05		PTE4S5		PT415	4TM-S5	

Note 1. Some models may use a 25MMF @ 25V in this application.
Note 2. Some models may use an .05MFD @ 400V in this application.

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	AIRLINE PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	
R1A	500KΩ	½	18X105	Q13-133	A47-500K-Z	BSK-60-S	U-48	Tone
B	Shaft		Not Req.	Not Req.	KSS-3	Not Req.	Not Req.	Attach to R1A
R2A	500KΩ	½	18X106	Q19-133X		ABT-64	UT-431	Volume-tapped @ 300KΩ
B	Shaft		Not Req.	Not Req.		AK-4	Not Req.	Attach to R2A
C	Switch		Not Req.	Not Req.		KB-1	US-26	Attach to R2A

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	AIRLINE PART No.	IRC PART No.	
R3	470KΩ	½	A-60474	BTS-470K	Note 1
R4	47KΩ	½		BTS-47K	Note 2
R5	10KΩ	½	A-60103	BTS-10K	
R6	220KΩ	½	A-60224	BTS-220K	
R7	680KΩ	½	A-60684	BTS-680K	

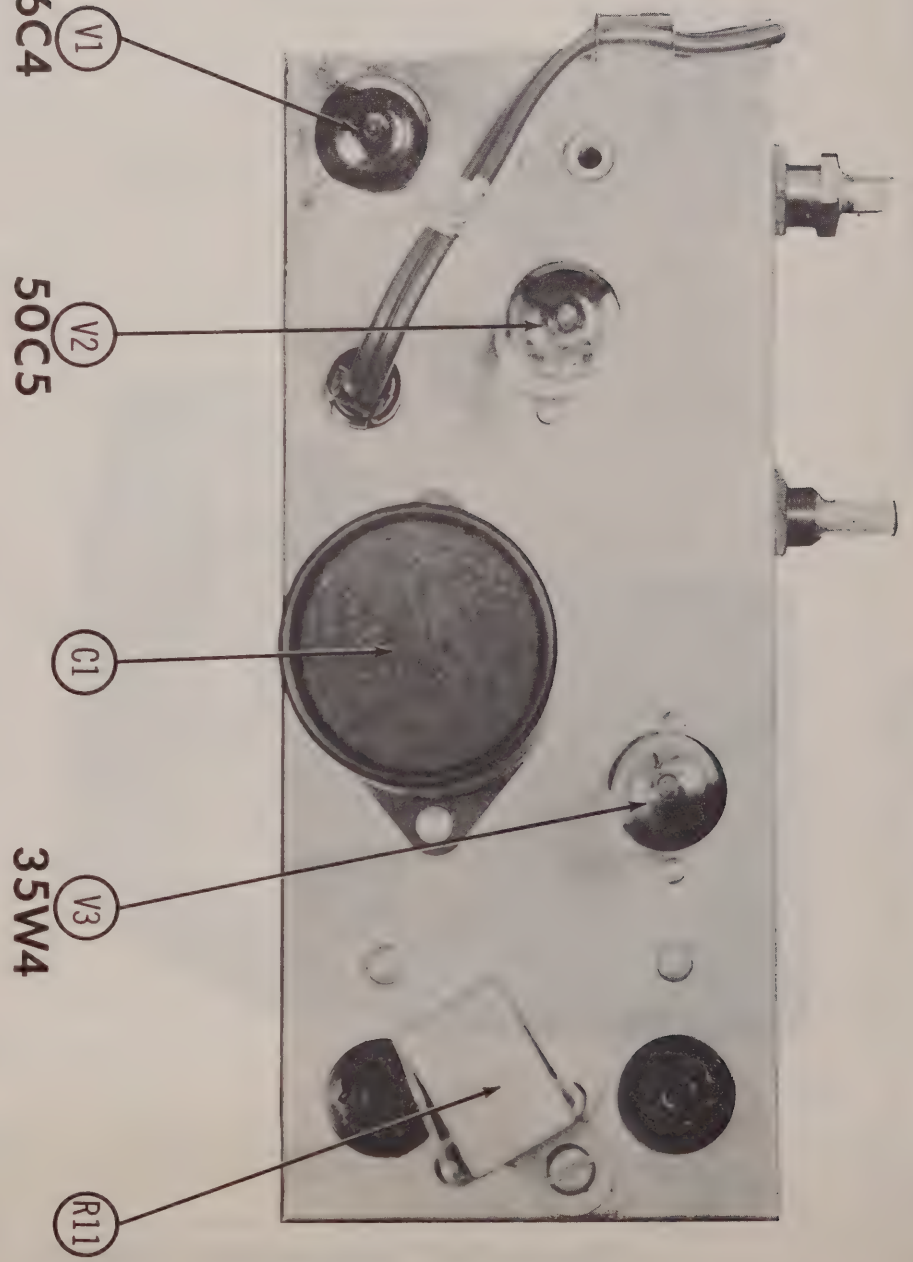
ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	AIRLINE PART No.	IRC PART No.	
R8	150Ω	½	A-50151	BTS-150	Note 3
R9	1000Ω	1	B-60102	BTA-1000	
R10	22Ω	½	A-60220	BTS-22	
R11	165Ω	5	38X130		

Note 1. Not used in all Models.
Note 2. Some models may use a 15KΩ resistor in this application.
Note 3. Some models may use a 150KΩ resistor in this application.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	AIRLINE PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Halldorson PART No.	Thordarson PART No.	
T1	2.4KΩ	3.4Ω	31X100 ①	A-3332	A-3025	S-1X ①	Z1101	24S50 ①	① Drill one new mounting hole.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

SPEAKER

ITEM No.	RATINGS			REPLACEMENT DATA			NOTES
	SIZE	FIELD	V. C. IMP.	AIRLINE PART No.	JENSEN PART No.	QUAM PART No.	
SP1	5"	PM	3.4Ω	12X104 ①	ST-105 Mod. P5-X	5A1	①

PHONO CARTRIDGE and NEEDLE

ITEM No.	REPLACEMENT DATA							REMARKS
	AIRLINE PART No.	ASTATIC PART No.		SHURE PART No.		ELECTRO-VOICE PART No.		
		CARTRIDGE	NEEDLE	CARTRIDGE	NEEDLE	CARTRIDGE	NEEDLE	
M1	60-33	ACD-C-2J *7-D	A-1 A-3	WC24-T	A53MG A52A	46 *2646	0-1 or S-1 & 0-3 or S-3	* Complete arm and cartridge assembly

ASTATIC, SHURE AND ELECTRO-VOICE NEEDLE LISTINGS SHOWN ABOVE ARE SPECIFIED FOR THE RESPECTIVE REPLACEMENT CARTRIDGES LISTED. FOR ORIGINAL CARTRIDGE NEEDLE REPLACEMENT SEE BELOW.

PHONO NEEDLE

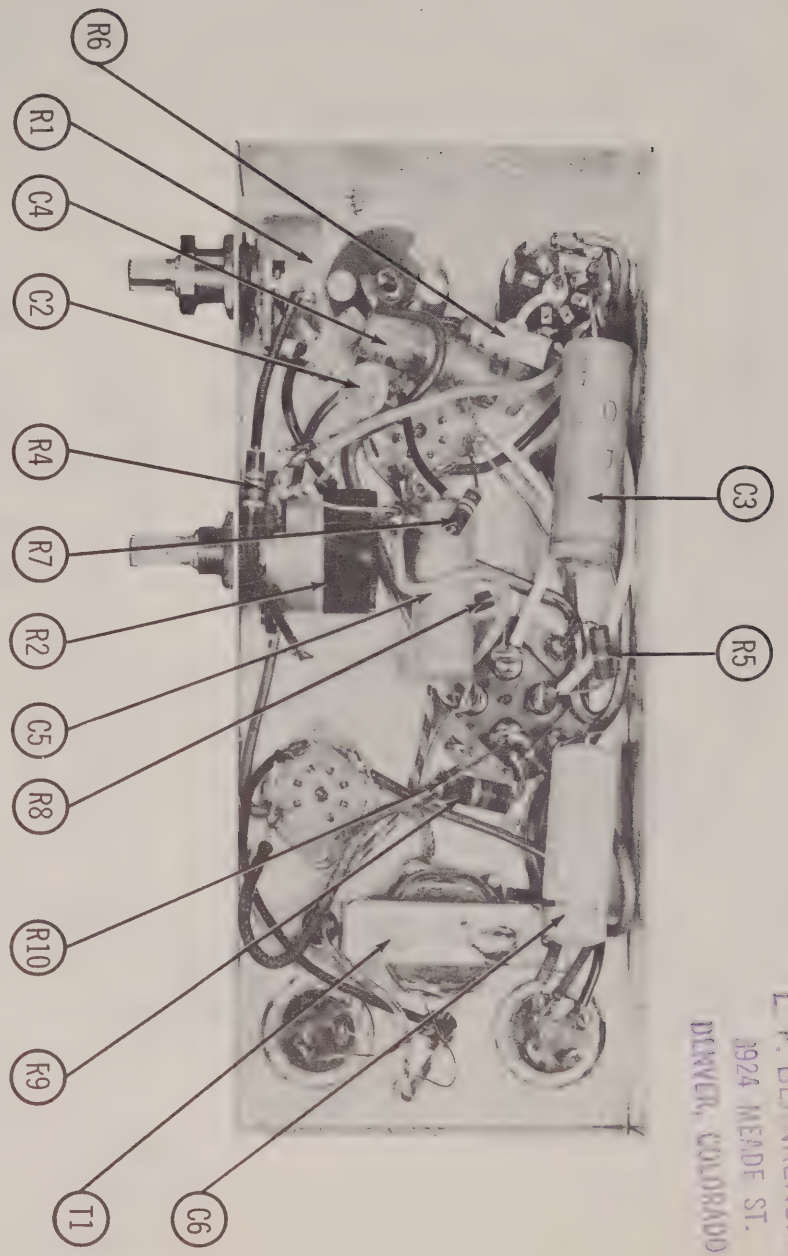
(FOR REPLACEMENT IN ORIGINAL EQUIPMENT CARTRIDGE)

ITEM No.	REPLACEMENT DATA				REMARKS
	AIRLINE PART No.	JENSEN PART No.	PERMO PART No.	WALCO PART No.	
M2	61H30 (33 1/3, 45RPM) 61H29 (78RPM)	†A-75LP (or) *A-85LP & †A-75 (or) *A-85	†A-347 (or) *A-319 & †C-348 (or) *C-309	†W-5MGS (or) *W-5MGA & †W-5S (or) *W-5A	* Metal † Jewel

MISCELLANEOUS

ITEM No.	PART NAME	AIRLINE PART No.	NOTES
M3	Motor	32X100	3 Speed with turntable
M4	Turntable	5X105	Brown 8"
	Disk	15X101	45RPM
	Knob	10X106	(2) used, brown

CHASSIS—BOTTOM VIEW



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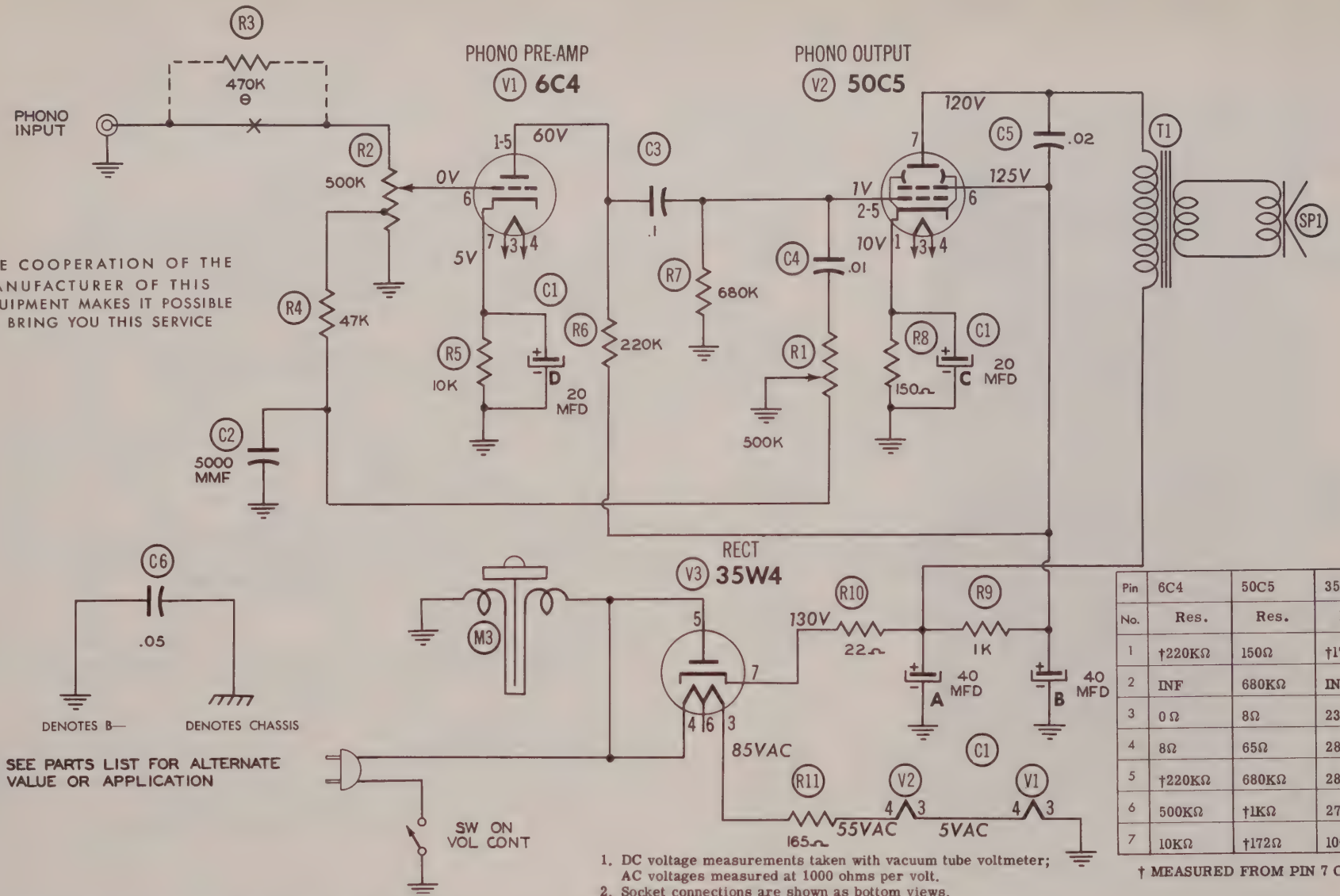
DENVER, COLORADO

AIRLINE
MODEL 25GHM-938A



Pin No.	6C4 Res.	50C5 Res.	35W4 Res.
1	†220KΩ	150Ω	†172Ω
2	INF	680KΩ	INF
3	0Ω	8Ω	230Ω
4	8Ω	65Ω	280Ω
5	†220KΩ	680KΩ	280Ω
6	500KΩ	†1KΩ	275Ω
7	10KΩ	†172Ω	100KΩ

† MEASURED FROM PIN 7 OF V3

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6. All controls at minimum, proper output load connected.

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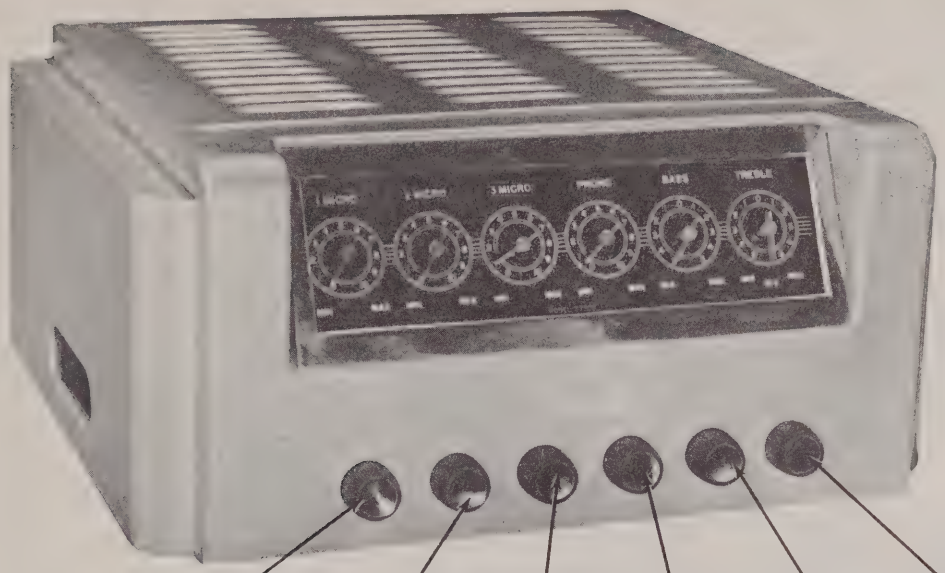
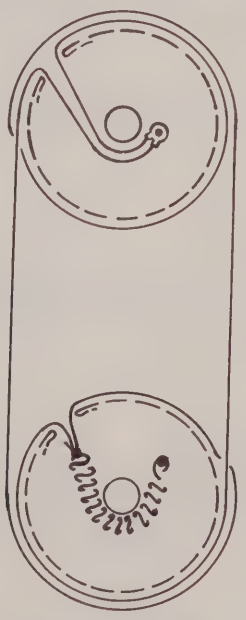
BELL SOUND
MODELS PA3750-B, 3750-B



1 MIC VOLUME CONTROL | 2 MIC VOLUME CONTROL | 3 MIC VOLUME CONTROL | PHONO VOLUME CONTROL | BASS CONTROL | TREBLE CONTROL

BELL SOUND
MODELS PA3750-B, 3750-B

TRADE NAME	Bell Sound Models PA3750-B, 3750-B
MANUFACTURER	Bell Sound Systems, Inc., 555 Marion Rd., Columbus, Ohio
TYPE SET	AC Operated 4 Channel 50 Watt Audio Amplifier
TUBES (Twelve)	Types (3) 7C6 Mic Pre. Amp., (2) 6SC7 Mixer, 6SC7 Phase Inv., 6SN7GT Driver, (2) 6L6G Audio Output, 5U4G Rectifier, 5V4G Rectifier, 5R4GY Rectifier
POWER SUPPLY	105-117-128 Volts AC-50/60 Cycles RATING 1.66 Amp. @ 117 Volts AC



DIALS FULLY CLOCKWISE.

(6 USED)

DRIVE CORD STRINGING

HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

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PARTS LIST AND DESCRIPTIONS

BELL SOUND
MODEL PA3750-B

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA		RETMA BASE TYPE	NOTES
		Bell Sound PART No.	STANDARD REPLACEMENT		
V1	Micro Pre. Amp.	7C6	7C6	8W	
V2	Micro Pre. Amp.	7C6	7C6	8W	
V3	Micro Pre. Amp.	7C6	7C6	8W	
V4	Mixer	6SC7	6SC7	8S	
V5	Mixer	6SC7	6SC7	8S	
V6	Phase Inverter	6SC7	6SC7	8S	
V7	Driver	6SN7GT	6SN7GT	8BD	
V8	Output	6L6G	6L6G	7S	
V9	Output	6L6G	6L6G	7S	
V10	Rectifier	5U4G	5U4G	5T	
V11	Rectifier	5V4G	5V4G	5L	
V12	Rectifier	5R4GY	5R4GY	5T	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

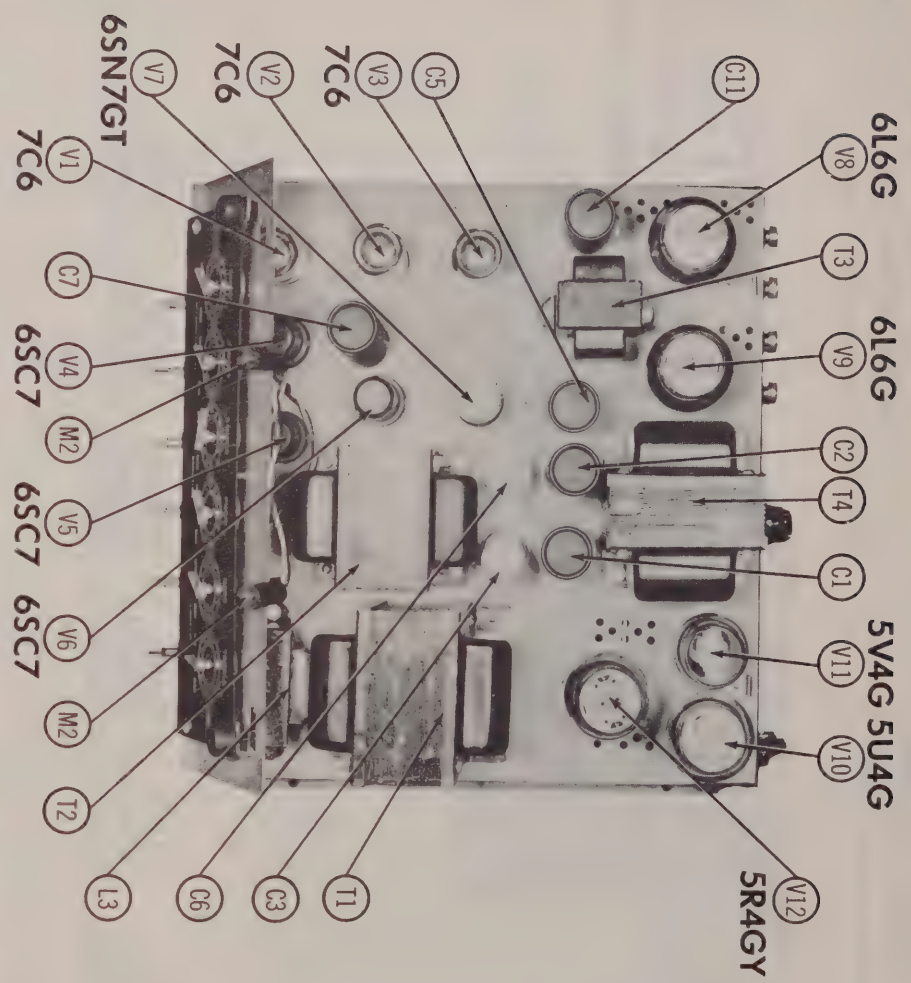
ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	Bell Sound PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C1	40	450		AFH1-52		A048		FP146	TVL-1725	
C2	40	450		AFH1-52		A048		FP146	TVL-1725	
C3A	20	450		AFH2-51		B040		FP234	TVL-2755	
B	20	450								
C4	100	150		AFH1-21		A024		FP116	TVL-1423	
C5	100	150		AFH1-21		A024		FP116	TVL-1423	
C6A	10	450		AFH2-47		B037		FP231	TVL-2750	
B	10	450								
C7	40	450		AFH1-52		A048		FP146	TVL-1725	
C8	150	15		PRS150/150		BRH5015		TC495	TVA-1311	
C9	.01	600		P688-01		PTE6S1		PT611	6TM-S1	
C10	.01	600		P688-01		PTE6S1		PT611	6TM-S1	
C11	.01	600		P688-01		PTE6S1		PT611	6TM-S1	
C12	.05	600		P688-05		PTE6S5		PT615	6TM-S5	
C13	.05	600		P688-05		PTE6S5		PT615	6TM-S5	
C14	.05	600		P688-05		PTE6S5		PT615	6TM-S5	
C15	.05	600		P688-05		PTE6S5		PT615	6TM-S5	
C16	.02	600		P688-02		PTE6S2		PT612	6TM-S2	
C17	.05	600		P688-05		PTE6S5		PT615	6TM-S5	
C18	.006	600		P688-006		PTE6D6		PT626	6TM-D6	
C19	.003	600		P688-003		PTE6D3		PT623	6TM-D3	
C20	.01	600		P688-01		PTE6S1		PT611	6TM-S1	
C21	.003	600		P688-003		PTE6D3		PT623	6TM-D3	
C22	.01	600		P688-01		PTE6S1		PT611	6TM-S1	
C23	.1	600		P688-1		PTE6P1		PT601	6TM-P1	
C24	.05	600		P688-05		PTE6S5		PT615	6TM-S5	
C25	.01	2000								

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESIST-ANCE	WATTS	Bell Sound PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	
R1A	1 Meg	½	B20066P-106	Q13-137	A47-1 Meg-Z	AB-70	U-53	Mike volume # 1- Note # 1
B	Shaft		Not Req.	Not Req.	KSS-3	AK-4	Not Req.	Attach to R1A
R2A	1 Meg	½	B20066P-106	Q13-137	A47-1Meg-Z	AB-70	U-53	Mike volume # 2- Note # 2
B	Shaft		Not Req.	Not Req.	KSS-3	AK-4	Not Req.	Attach to R2A
R3A	1 Meg	½	B20066P-106	Q13-137	A47-1Meg-Z	AB-70	U-53	Mike volume # 3-Note # 1
B	Shaft		Not Req.	Not Req.	KSS-3	AK-4	Not Req.	Attach to R3A
R4A	1 Meg	½	B20066P-106	Q13-137	A47-1Meg-Z	AB-70	U-53	Phono Volume - Note # 1
B	Shaft		Not Req.	Not Req.	KSS-3	AK-4	Not Req.	Attach to R4A
R5A	1 Meg	½	B20066P-110	Q14-137		AB-68	U-53	Bass- Note # 2
B	Shaft		Not Req.	Not Req.		AK-4	Not Req.	Attach to R5A
R6	250KΩ	½	B20066P-111					Treble & switch tapped @ 220K- Note 3.

Note 1. Some models may use an alternate control Part No. B-20066P65.
Note 2. Some models may use an alternate control Part No. B-20066P43.
Note 3. Some models may use an alternate control Part No. B-20066P54.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA Bell Sound PART No.	REPLACEMENT DATA IRC PART No.	NOTES
R7	10 Meg	½		BTS-10 Meg	
R8	150KΩ	½		BTS-150K	
R9	100KΩ	½		BTS-100K	
R10	10 Meg	½		BTS-10 Meg	
R11	150KΩ	½		BTS-150K	
R12	100KΩ	½		BTS-100K	
R13	10 Meg	½		BTS-10 Meg	
R14	150KΩ	½		BTS-150K	
R15	100KΩ	½		BTS-100K	
R16	10KΩ	½		BTS-10K	
R17	10KΩ	½		BTS-10K	
R18	50KΩ	1			Note 1
R19	56KΩ	½		BTS-56K	
R20	470Ω	½		BTS-470	
R21	10KΩ	½		BTS-10K	
R22	10KΩ	½		BTS-10K	
R23	33KΩ	½		BTS-33K	
R24	24KΩ 5%	½		BTS-24K 5%	

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA Bell Sound PART No.	REPLACEMENT DATA IRC PART No.	NOTES
R25	51KΩ 5%	½		BTS-51K 5%	
R26	470KΩ	½		BTS-470K	
R27	390Ω	½		BTS-390	
R28	51KΩ 5%	½		BTS-51K 5%	
R29	51KΩ 5%	½		BTS-51K 5%	
R30	680Ω	½		BTS-680	
R31	100KΩ	½		BTS-100K	
R32	100KΩ	½		BTS-100K	
R33	100KΩ	½		BTS-100K	
R34	30KΩ	½		BTS-30K	Note 2
R35	2700Ω	2		BTB-2700	
R36	25KΩ	20		2D-25,000	
R37	270Ω	½		BTS-270	
R38	270Ω	½		BTS-270	
R39	400Ω	10		1 3/4A-400	
R40	50Ω	10		1 3/4A-50	
R41	200Ω	10			
R42	1000Ω	2		BTB-1000	
R43	25K Ω	25			

Note 1. Some models may use a 56KΩ resistor in this application.
Note 2. Some models may use a 33KΩ resistor in this application.

TRANSFORMER (POWER)

ITEM No.	RATING PRI.	SEC. 1	SEC. 2	SEC. 3	REPLACEMENT DATA Bell Sound PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Halldorson PART No.	Thordarson PART No.
T1	117VAC ② .8A	1050VCT .100ADC	516VCT .039ADC		B-20135 ①					
T2	117VAC ② .86A	226VCT .220ADC	5VAC ② 3A	5VAC ② 2A	B-20136					
			SEC. 4	SEC. 5						
			5 VAC ② 2A	6.3VCT ② 3.8A						

① This transformer has pri. taps for 105V, 117V & 125V input.

TRANSFORMER

ITEM No.	RATING PRI.	SEC. 1	SEC. 2	SEC. 3	REPLACEMENT DATA Bell Sound PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Halldorson PART No.	Thordarson PART No.
T3	670 ΩCT .007A (each half)	244ΩCT			B-20075 ①				A2710 ②	

① Turns ratio 2.7 to 1
② Drill one new mounting hole.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE PRI.	IMPEDANCE SEC.	REPLACEMENT DATA Bell Sound PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Halldorson PART No.	Thordarson PART No.	NOTES
T4	3KΩCT	500Ω*	B-20084-7						* Tapped ② 250Ω, 100Ω, 16Ω, 8Ω, 4Ω 2Ω.

FILTER CHOKE

ITEM No.	RATINGS TOTAL DIRECT CURRENT	RATINGS D. C. RESISTANCE	RATINGS INDUCTANCE (0 CURRENT 1000 ∿)	REPLACEMENT DATA Bell Sound PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Halldorson PART No.	Thordarson PART No.
L1	.100ADC	94Ω	5HY	B-20055	C-1710		C-15X	C5027	
L2	.010ADC	490Ω	12.6HY	B-20058	C-2990 ①	C-1708 ①	C-13X	C5004	20C52 ①
L3	.039ADC	400Ω	19.6HY	B-20087	C-1708 ①		C-5X ①	C5016 ①	20C53 ①

① Drill one new mounting hole.

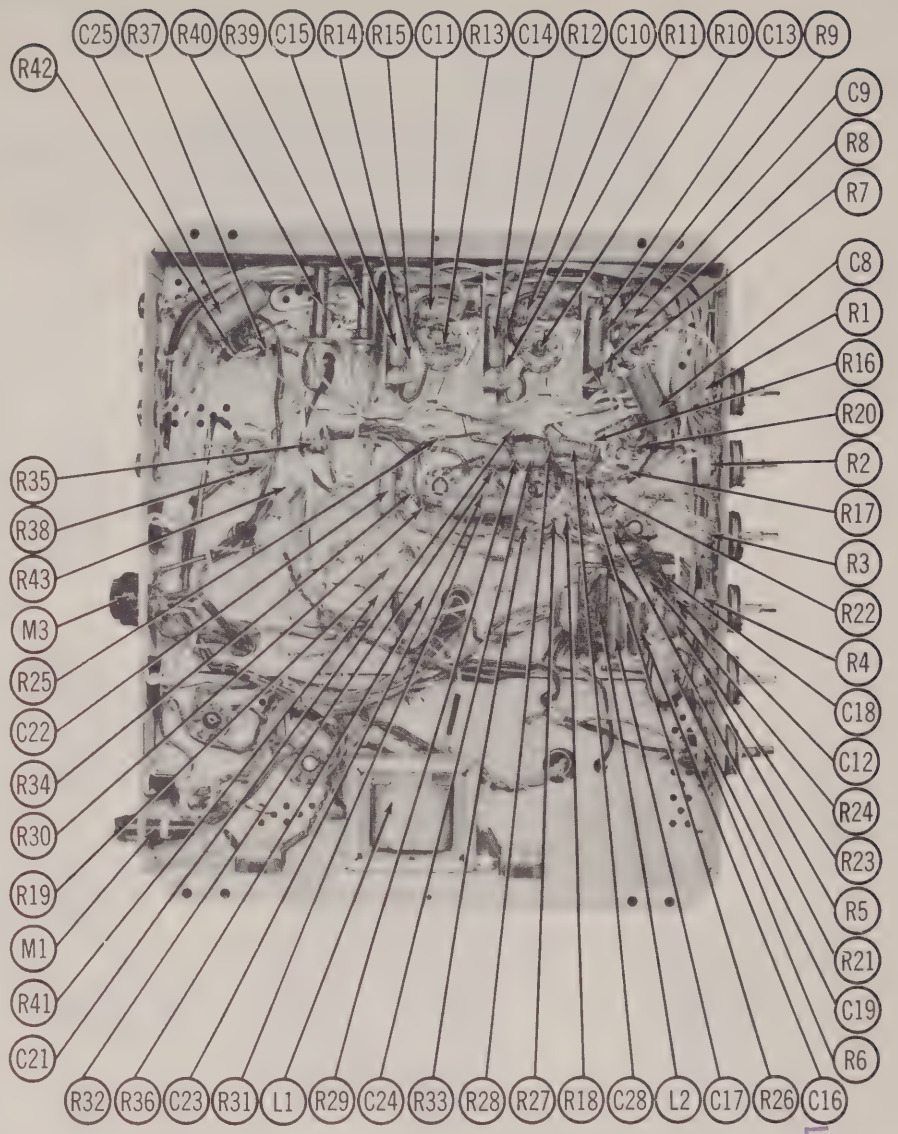
FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA Bell Sound PART No. FUSE	Bell Sound PART No. HOLDER	LITTELFUSE PART No. FUSE	LITTELFUSE PART No. HOLDER	BUSS PART No. FUSE	BUSS PART No. HOLDER
M1	3AGS/B	3A			313003 (3AG S/B-3A)	155020	MDL3	HDJ

MISCELLANEOUS

ITEM No.	PART NAME	Bell Sound PART No.	NOTES
M2	Dial light		# 51 bayonet (2) used
M3	Switch		Impedance matching
M4	Relay		Remote operation (B-11397P1)

CHASSIS BOTTOM VIEW



PROPERTY OF
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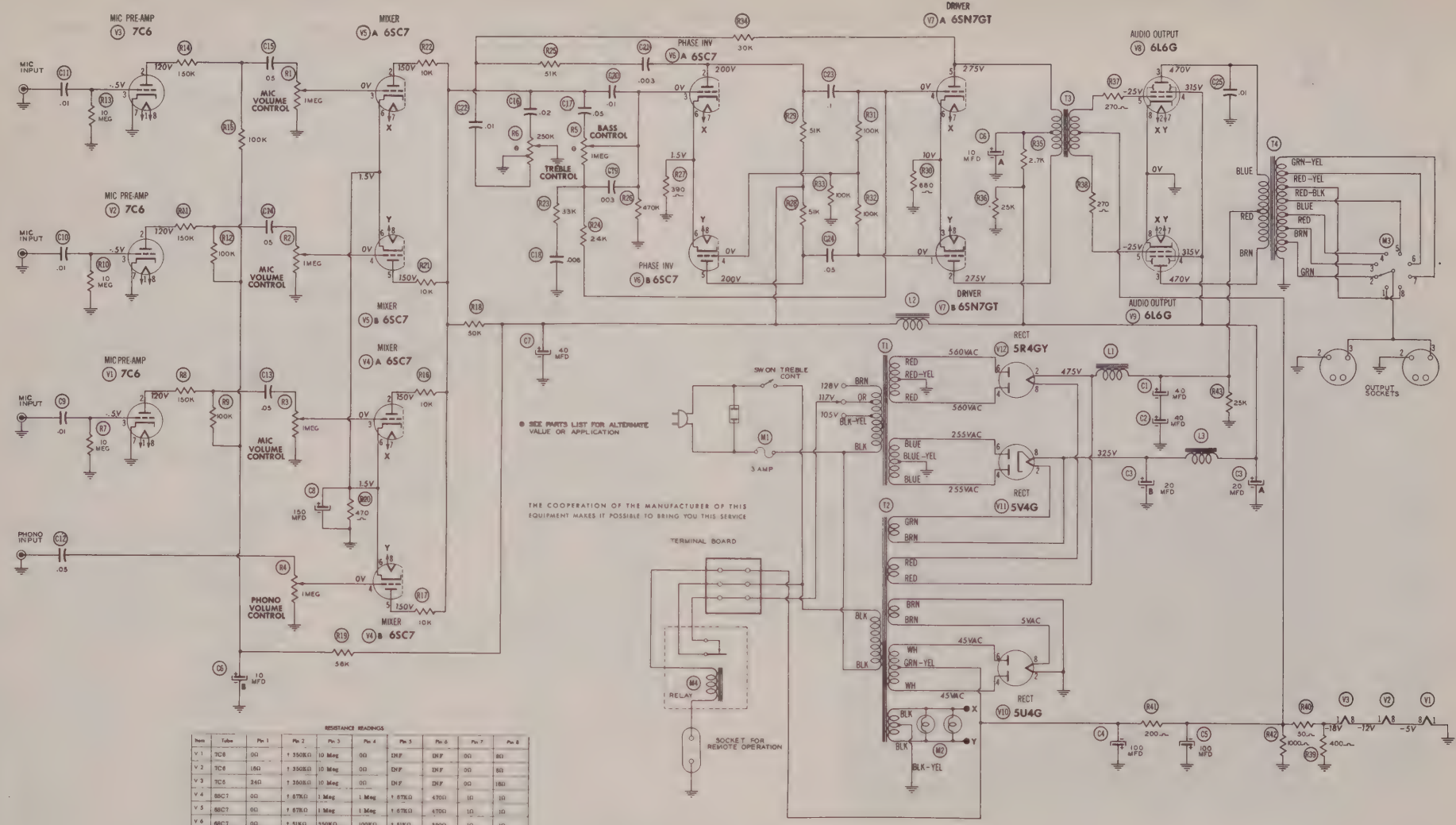
3924 MILAN
DENVER, COLORADO

BELL SOUND
MODEL PA3750-B

BELL SOUND
MODEL PA3750-B

SET 250
FOLDER 5



RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
V 1	7C6	0Ω	↑ 350KΩ	10 Meg	0Ω	INF	INF	0Ω	8Ω
V 2	7C6	18Ω	↑ 350KΩ	10 Meg	0Ω	INF	INF	0Ω	8Ω
V 3	7C6	24Ω	↑ 350KΩ	10 Meg	0Ω	INF	INF	0Ω	18Ω
V 4	6SC7	0Ω	↑ 87KΩ	1 Meg	1 Meg	↑ 87KΩ	470Ω	1Ω	1Ω
V 5	6SC7	0Ω	↑ 87KΩ	1 Meg	1 Meg	↑ 87KΩ	470Ω	1Ω	1Ω
V 6	6SC7	0Ω	↑ 51KΩ	350KΩ	100KΩ	↑ 51KΩ	390Ω	1Ω	1Ω
V 7	6SN7GT	300KΩ	↑ 3. 6KΩ	680Ω	300KΩ	↑ 3. 6KΩ	680Ω	.1Ω	.1Ω
V 8	6L6G	0Ω	.1Ω	↑ 1. 6KΩ	↑ 400Ω	∘ 800Ω	0Ω	.1Ω	8Ω
V 9	6L6G	0Ω	.1Ω	↑ 1. 6KΩ	↑ 400Ω	∘ 800Ω	0Ω	1Ω	0Ω
V 10	5U4G	INF	27Ω	INF	13Ω	INF	13Ω	INF	0Ω
V 11	5V4G	INF	38KΩ	INF	100Ω	INF	100Ω	INF	38KΩ
V 12	5R4GY	INF	27KΩ	INF	50Ω	INF	50Ω	INF	27KΩ

↑ MEASURED FROM PIN 8 OF V12.
↑ MEASURED FROM PIN 3 OF V12.
∘ MEASURED FROM CENTER TAP OF SECONDARY #1 ON T2

1. DC voltage measurements taken with vacuum tube voltmeter, AC voltages measured at 1000 ohms per volt
2. Socket connections are shown as bottom views
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 10% in voltage and resistance readings
6. All controls at minimum, proper output load connected.

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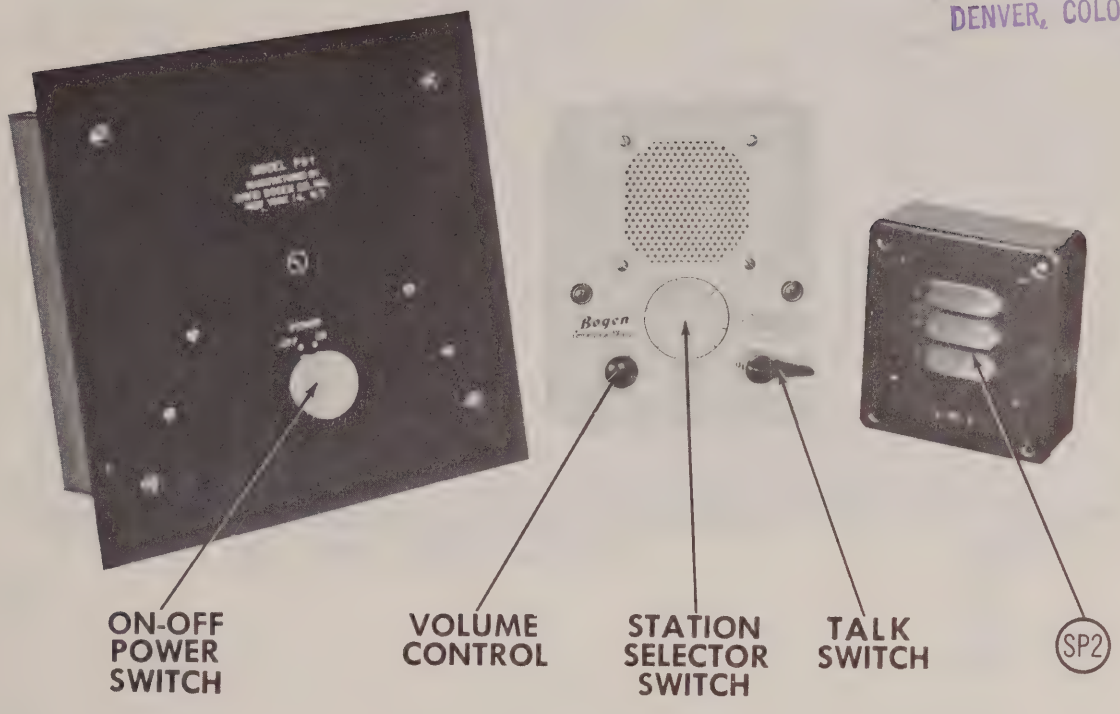
DAVID BOGEN
MODELS FC-1, FR-1, PS-1



DAVID BOGEN
MODELS FC-1, FR-1, PS-1

TRADE NAME	David Bogen Models FC-1 (Control), FR-1 (Remote), PS-1 (Power Supply)
MANUFACTURER	David Bogen Co., Inc., 29 Ninth Ave., New York 14, N. Y.
TYPE SET	AC-DC Intercommunication System with Common Power Supply & Amplifier for all control units.
TUBES (Two)	Types 1L4 AF Amp., 3V4 Audio Output
POWER SUPPLY	110-120 Volts AC-DC RATING .14 Amp. @ 117 Volts AC

HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

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PARTS LIST AND DESCRIPTIONS

DAVID BOGEN
MODEL FC-1

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA		RETMA BASE TYPE	NOTES
		David Bogen PART No.	STANDARD REPLACEMENT		
V1	AF Amplifier	1L4	1L4	6AR	
V2	Output	3V4	3V4	6BX	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	David Bogen PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C1A	■ 40	150		AFH3-07		C008		FP212	TVL-3435	
B	▲ 30	150						TC42		
C	10	150								
C2	100	25		PRS25/100		BRH251		TC2501	TVA-1207	
C3	.003	600		P688-003	D6-302	PTE6D3	GP2-333-302	PT623	6TM-D3	
C4	.003	600		P688-003	D6-302	PTE6D3	GP2-333-302	PT623	6TM-D3	
C5	.01	600		P688-01	D6-103	PTE6S1	GP2-333-103	PT611	6TM-S1	
C6	500	500		1469-0005		5R5T5		MCB245	MS-35	

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	David Bogen PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	
R1A	330Ω	2	V260-A	W-300	A43-300	V-125		Volume
B	Shaft		Not Req.	Not Req.	FS-3	Not Req.		Attach to R1B

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	David Bogen PART No.	IRC PART No.	
R2	220KΩ	1		BTS-220K	
R3	10 Meg	1		BTS-10 Meg	
R4	150Ω	1		BTS-150	
R5	3.3 Meg	1		BTS-3.3Meg	
R6	470KΩ	1		BTS-470K	
R7	1 Meg	1		BTS-1 Meg	
R8	330Ω	1		BTS-330	
R9	47Ω	1		BTS-47	

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	David Bogen PART No.	IRC PART No.	
R10	1500Ω	1/2		BTS-1500	
R11	10KΩ	1/2		BTS-10K	
R12	2000Ω	7		1 3/4A-2000	
R13	15KΩ	1/2		BTS-15K	Note 1
R14	68Ω	2			
R15	150Ω	1/2		BTS-150	
R16	4700Ω	1/2		BTS-4700	Note 1
R17	100Ω	1/2		BTS-100	

Note 1. Some models may use a 10KΩ resistor in this application.

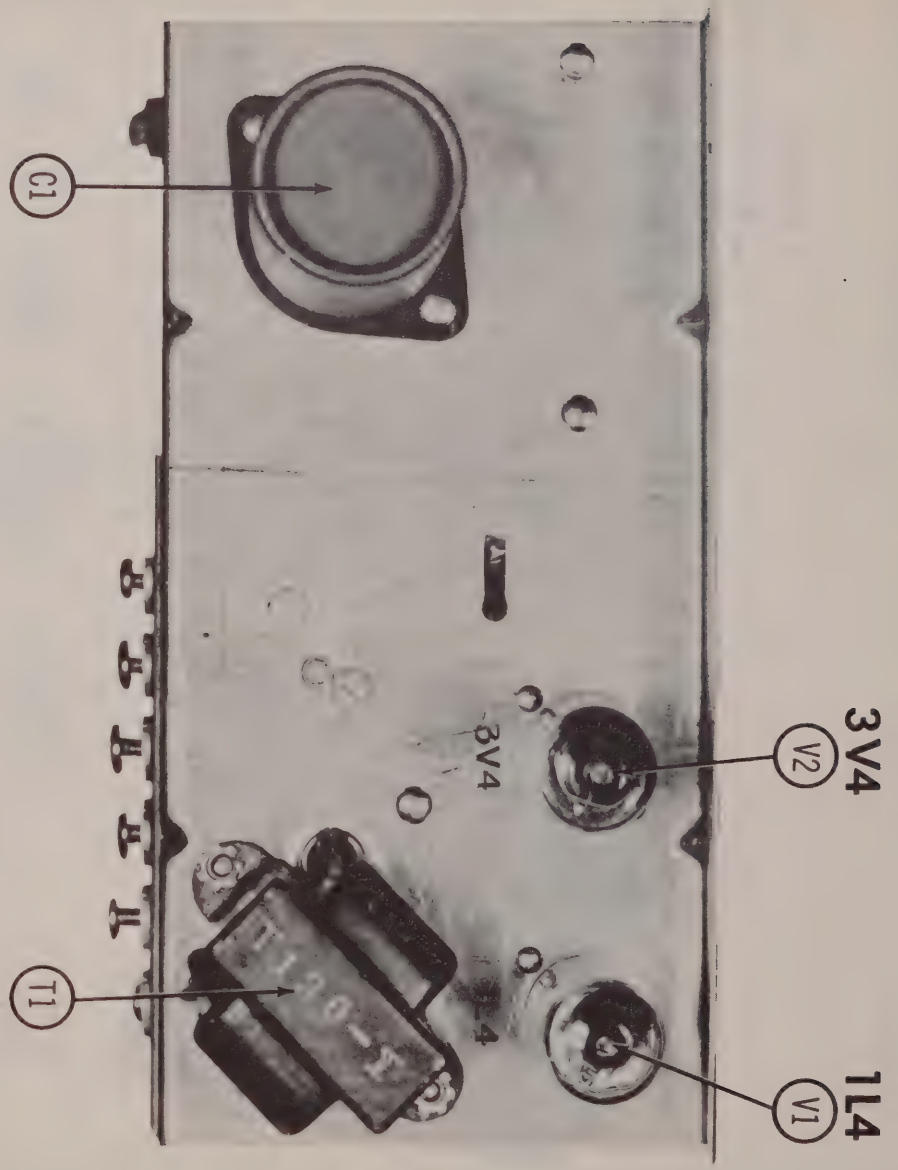
TRANSFORMER (INPUT)

ITEM No.	RATING				REPLACEMENT DATA					
	PRI.	SEC. 1	SEC. 2	SEC. 3	David Bogen PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Halldorson PART No.	Thordarson PART No.
T1	4.2Ω	575Ω			T-130-1			A-1X		
	Turns ratio 1 to 26									

TRANSFORMER (POWER)

ITEM No.	RATING			REPLACEMENT DATA						
	PRI.	SEC. 1	SEC. 2	David Bogen PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	RCA TYPE No.	Halldorson PART No.	Thordarson PART No.
T1	4.2Ω	575Ω		T-130-1			A-1X			

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	David Bogen PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Halldorson PART No.	Thordarson PART No.	
T2	10KΩ	45Ω	T282		A-2902		Z1002		

SPEAKER

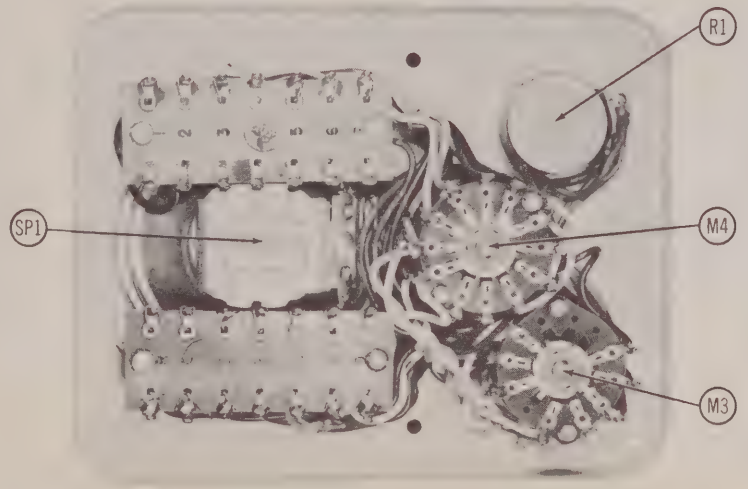
ITEM No.	RATINGS			REPLACEMENT DATA			NOTES
	SIZE	FIELD	V. C. IMP.	David Bogen PART No.	JENSEN PART No.	QUAM PART No.	
SP1	3½"	PM	45Ω			3A07Z45	
SP2	3½"	PM	45Ω			3A07Z45	

SELENIUM RECTIFIER

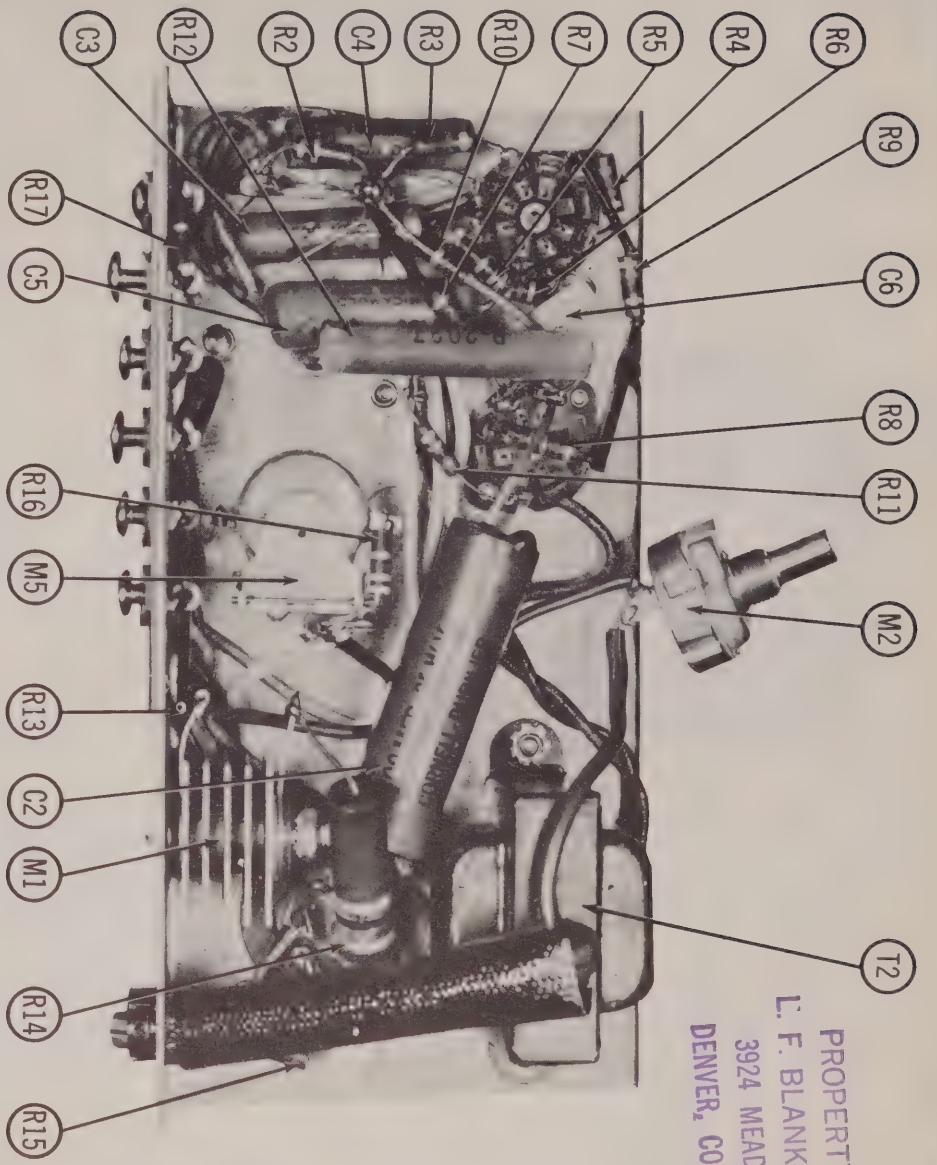
ITEM No.	RATING	REPLACEMENT DATA						NOTES
	CURRENT	David Bogen PART No.	FEDERAL PART No.	INTERNATIONAL PART No.	MALLORY PART No.	SARKES TARZIAN PART No.	SELETRON PART No.	
M1	.069 Amp.		1101A	RS100	6S100A	100	5M1	

MISCELLANEOUS

ITEM No.	PART NAME	David Bogen PART No.	NOTES
M2	Switch		Off-on power
M3	Switch		Talk-listen-pickup selector
M4	Switch		Station selector
M5	Switch		Relay



CHASSIS—BOTTOM VIEW



PROPERTY OF
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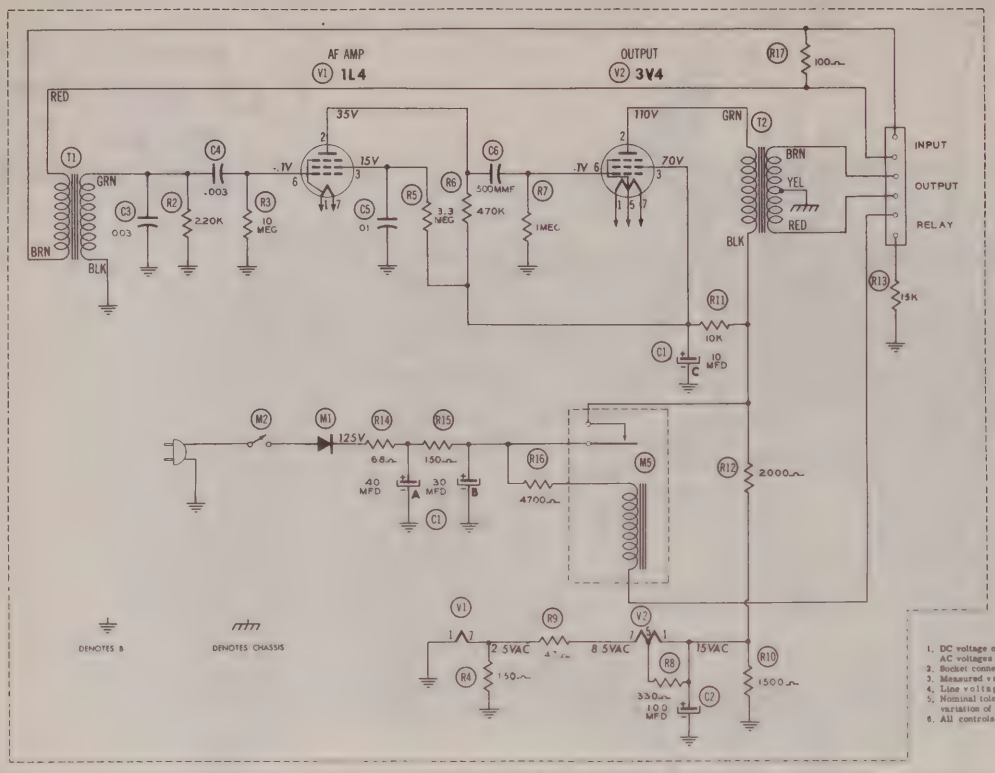
3924 MEADE ST.
DENVER, COLORADO

DAVID BOGEN
MODEL FC-1

DAVID BOGEN
MODEL FC-1

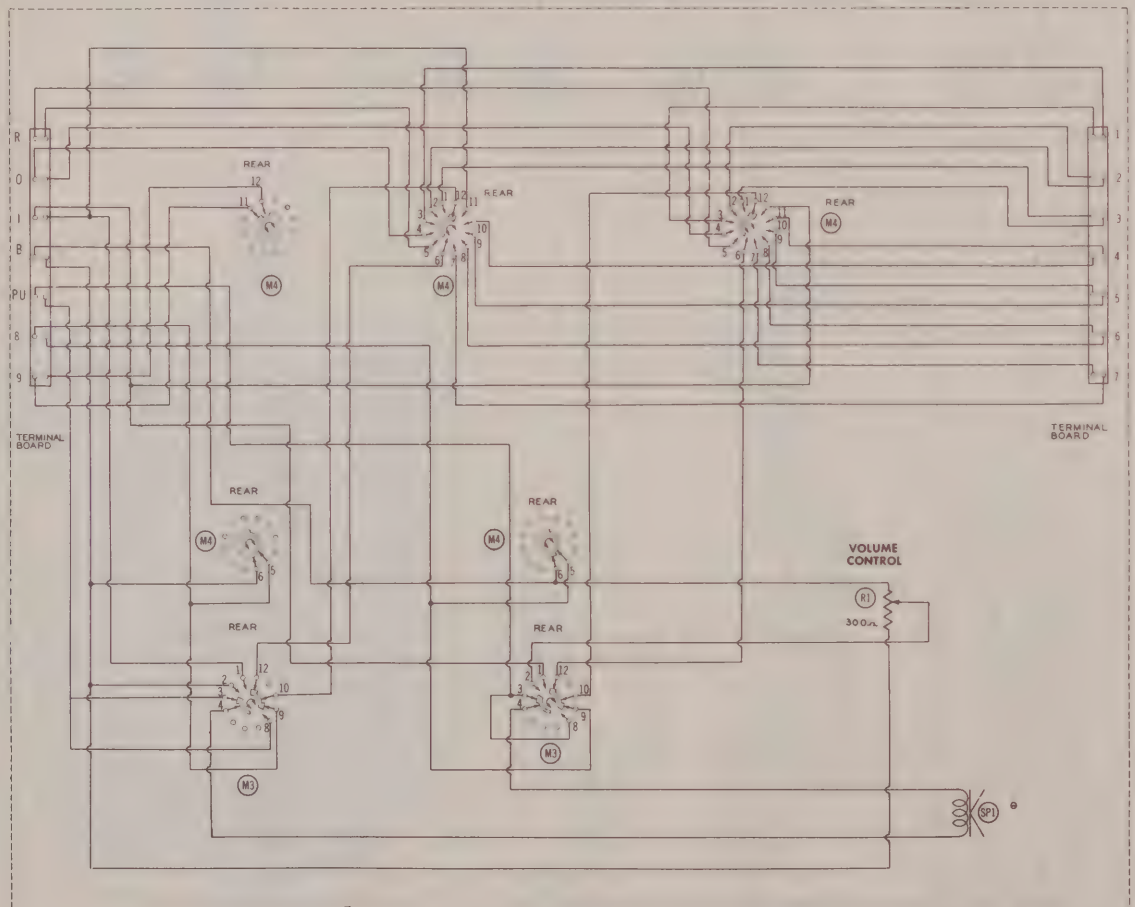


Pin No.	1L4 Res.	3V4 Res.
1	0Ω	•
2	485KΩ	3.7KΩ
3	3.3Meg	13.5KΩ
4	13.5KΩ	INF
5	0Ω	•
6	10 Meg	1 Meg
7	•	•

ALL VOLTAGE READINGS TAKEN WITH RELAY TERMINALS CONNECTED AND M4 TURNED TO STATION

* DO NOT USE OHMMETER TO MEASURE FILAMENT RESISTANCE

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings
6. All controls at minimum, proper output load connected.



THE COOPERATION OF THE MANUFACTURER OF THIS EQUIPMENT MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

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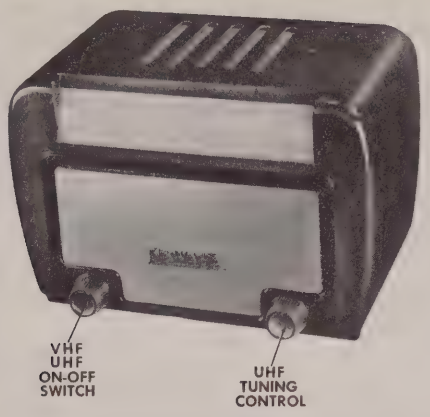
DEWALD
MODEL H-300 (UHF Conv.)



PROPERTY OF
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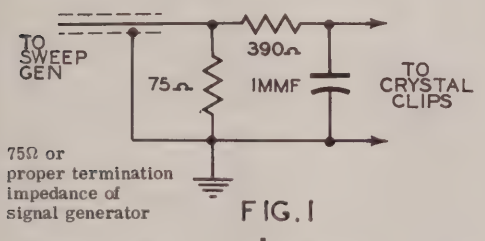
3924 MEADE ST.
DENVER, COLORADO

TRADE NAME	DeWald Model H-300
MANUFACTURER	DeWald Radio Mfg. Co., 35-15 37th. Ave., Long Island City, N.Y.
TYPE SET	AC Operated All Channel UHF Converter
TUBES (Three)	Types 6AF4 Osc., 6BQ7A IF Amp., 6X4 Rectifier
POWER SUPPLY	110-120 Volts AC RATING .26 Amp. @ 117 Volts AC
TUNING RANGE	Channels 14 thru 83

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

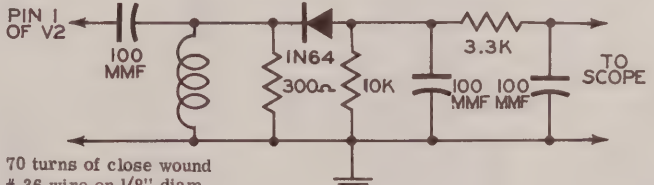
Connect the synchronized sweep voltage from the signal generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms. (See Fig. 1)

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GEN FREQ	CONNECT SCOPE	ADJUST	REMARKS
1.	Fig. 1	Thru crystal simulator (Fig. 1) to crystal clips. (Connect ground side of Fig. 1 to converter cavity clip terminal).	82MC (30MC Swp)	95MC	Vert. Amp. thru detector (Fig. 2) to pin 1 (plate) of 6BQ7A (V2). Low side to chassis.	A1	Remove 1N82 crystal. Connect jumper across secondary of L9. Couple the output of a second signal generator loosely (within few inches) to UHF converter to provide markers. Adjust A1 to place 95MC marker at 70% on response curve as shown in Fig. 4.
2.	"	"	"	69MC	"		Compress or expand L6 until 69MC markers are 70% on low frequency side of response curve. If necessary compress or expand L4 to obtain symmetrical response with proper bandwidth. Repeat steps 1 and 2 until response similar to Fig. 4 is obtained. Remove the detector from pin 1 of V2. Remove jumper across secondary of L9.
3.	"	"	"	76MC 82MC 88MC	Vert. Amp. thru balanced detector (Fig. 3) across secondary of L9.	A2, A3	Adjust for response similar to Fig. 5. Disconnect test equipment. Replace 1N82 crystal.



75Ω or proper termination impedance of signal generator

FIG. 1



70 turns of close wound # 36 wire on 1/8" diam. mica filled bakelite form

FIG. 2

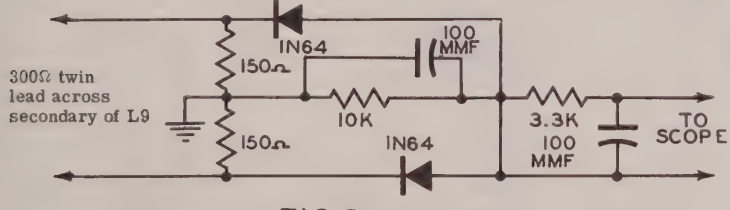


FIG. 3

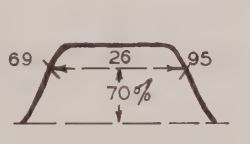


FIG. 4

FIG. 5

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PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA		RETMA BASE TYPE	NOTES
		DEWALD PART No.	STANDARD REPLACEMENT		
V1	UHF Oscillator	6AF4	6AF4	7DK	
V2	IF Amplifier	6BQ7A	6BQ7A	9AJ	
V3	Rectifier	6X4	6X4	5BS	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	DEWALD PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C1A	40	350		PRS450/40-40		BBRD4445		2N537	TVA-2740	Yellow - Note 1
B	40	350								Red-Note 1
C2	470			BPD-00047	D6-471	K060	GP2K-471	UC-5347	5GA-T47	
C3	470			BPD-00047	D6-471	K060	GP2K-471	UC-5347	5GA-T47	
C4	650									
C5	650									
C6	100			BPD-0001	D6-101	G042	GP1K-101	UC-531	5GA-T1	
C7	470			BPD-00047	D6-471	K060	GP2K-471	UC-5347	5GA-T47	
C8	470			BPD-00047	D6-471	K060	GP2K-471	UC-5347	5GA-T47	
C9	820									Note 2
C10	820									Note 2

Note 1. Some models may use a 20-20MFD @ 350V in this application.
Note 2. Not used in all models.

RESISTORS

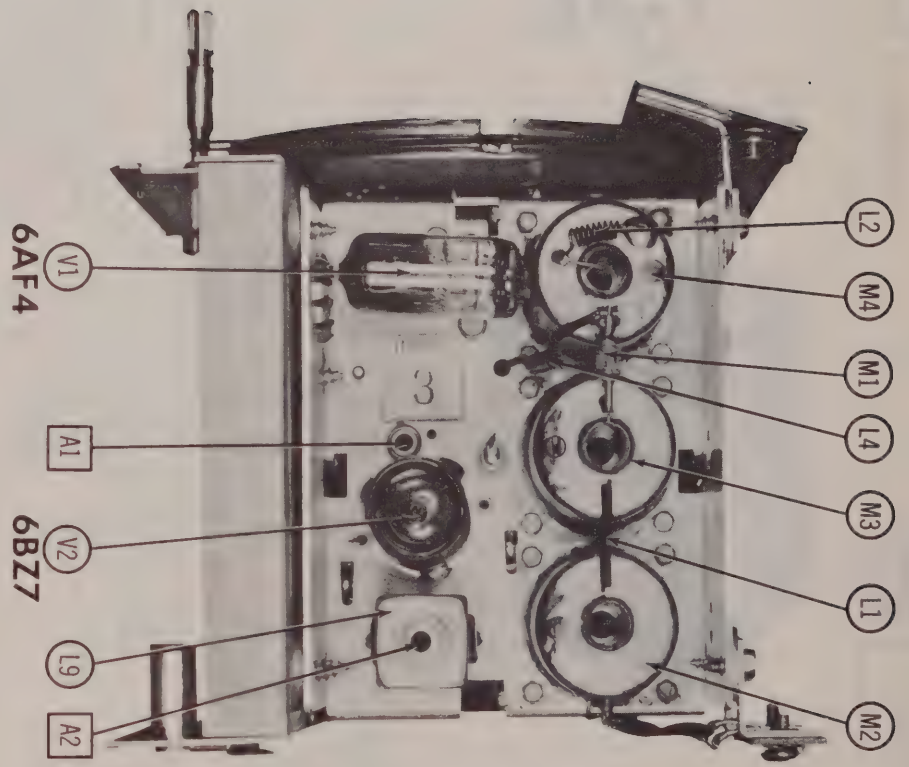
ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	DEWALD PART No.	IRC PART No.	
R1	5600Ω	1		BTA-5600	
R2	8200Ω	2		BTB-8200	
R3	1Meg	½		BTS-1Meg	
R4	1000Ω	½		BTS-1000	

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	DEWALD PART No.	IRC PART No.	
R5	27Ω	½		BTS-27	
R6	100Ω	½		BTS-100	
R7	1000Ω	1		BTA-1000	
R8	820KΩ	½		BTS-820K	

TRANSFORMER (POWER)

ITEM No.	RATING				REPLACEMENT DATA					
	PRI.	SEC. 1	SEC. 2	SEC. 3	DEWALD PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Halldorson PART No.	Thordarson PART No.
T1	117VAC @ .26A	240V .028ADC	6.3VAC @ 1.22A		1146-B					

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

COILS (RF-IF)

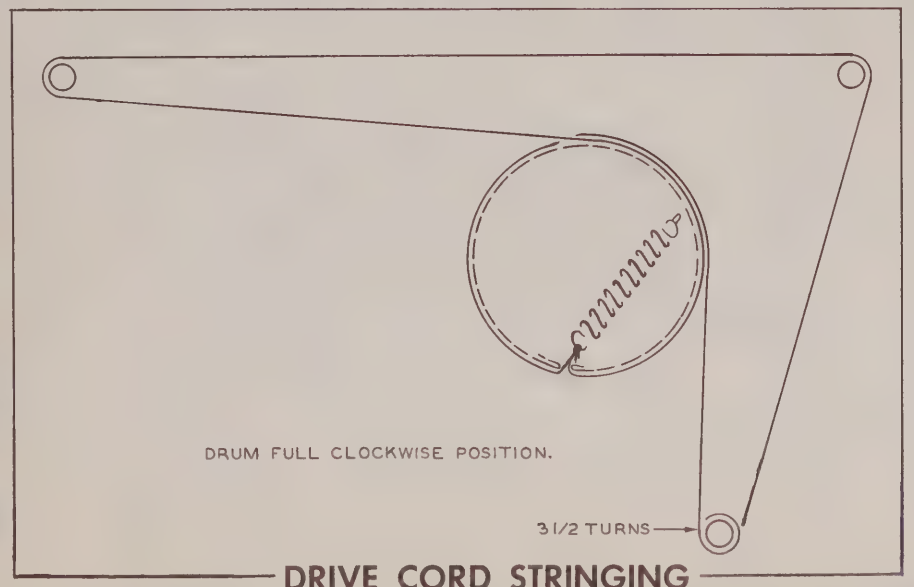
ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA: DEWALD PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	NOTES
L1	UHF RF Coupling	0Ω						
L2	Fil. Choke	0Ω						
L3	Fil. Choke	0Ω						
L4	UHF IF Input Coil Primary	0Ω						
L5	UHF IF Input Coil Secondary	0Ω						
L6	UHF IF Input Coil Mutual	0Ω						
L7	RF Choke	.2Ω						
L8	Neutr. Coil	.2Ω						
L9	UHF IF Output Coil	0Ω	0Ω					

CRYSTAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA: DEWALD PART No.	SYLVANIA PART No.	FEDERAL PART No.	NOTES
M1	1N82		1N82 or 1N82A		UHF Mixer

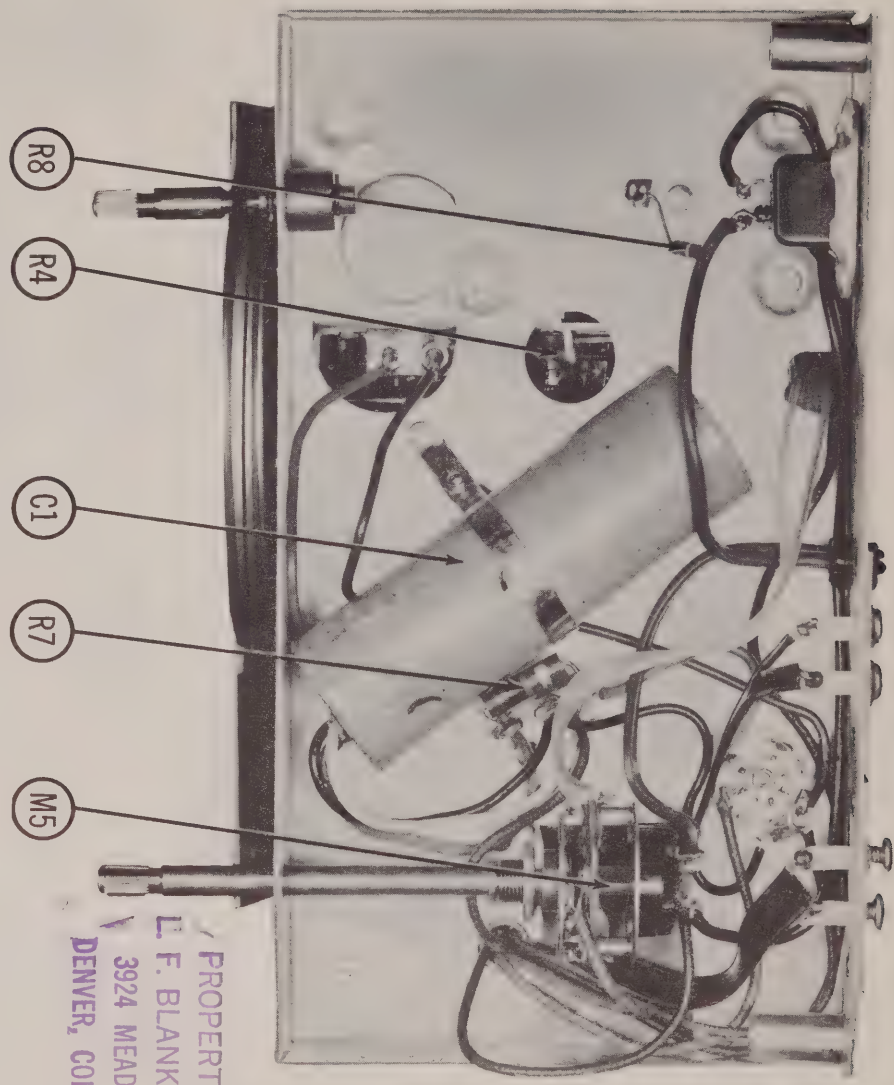
MISCELLANEOUS

ITEM No.	PART NAME	DEWALD PART No.	NOTES
M2	Preselector		1st. Assembly
M3	Preselector		2nd. Assembly
M4	Oscillator		Assembly
M5	Switch		VHF-UHF power



DRIVE CORD STRINGING

CHASSIS—BOTTOM VIEW



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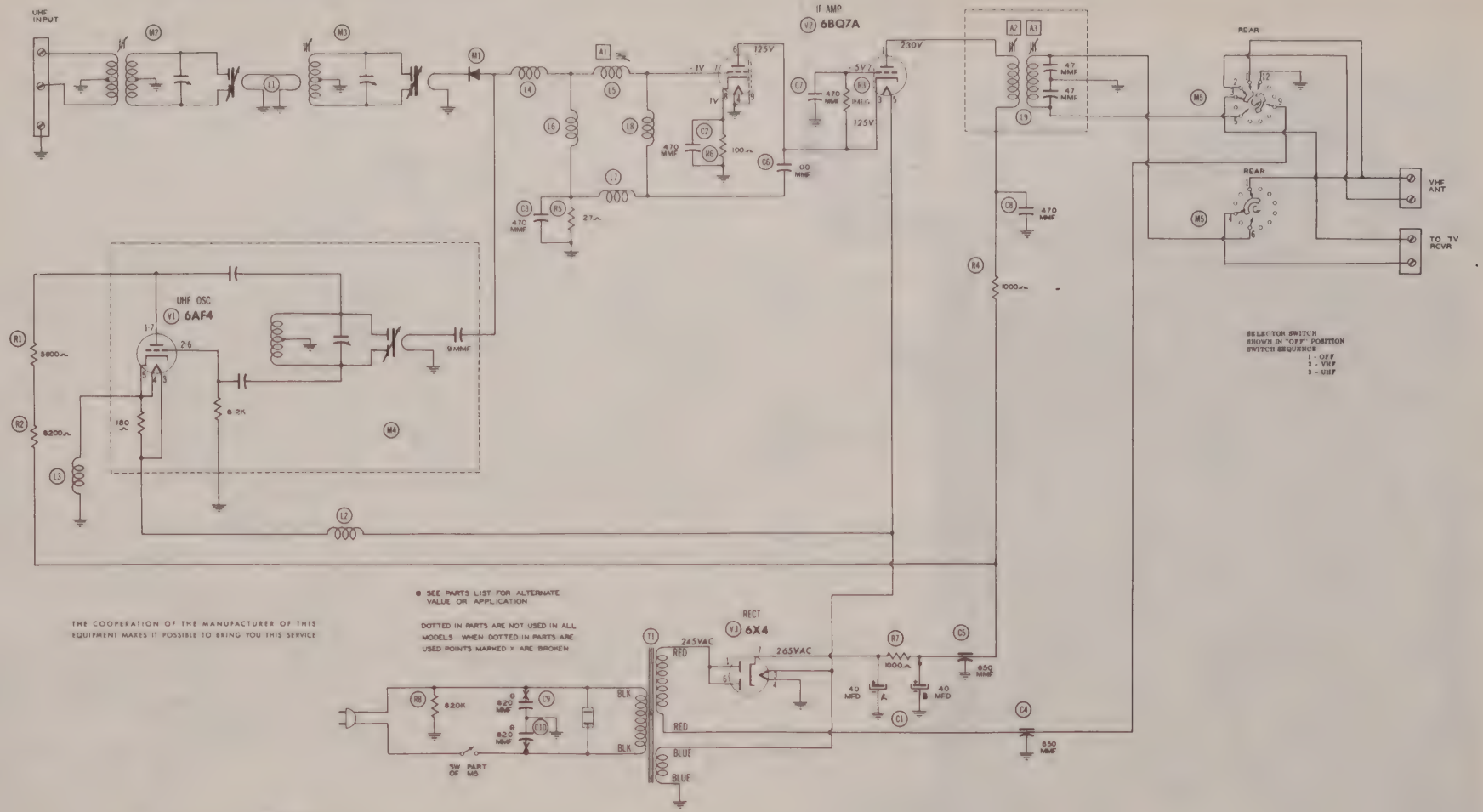
DEWALD MODEL H-300



RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	6AF4	†14.8KΩ	8.2KΩ	.1Ω	0Ω	0Ω	8.2KΩ	†14.8KΩ		
V 2	6BQ7A	†2KΩ	INF	INF	0Ω	.1Ω	INF	27Ω	100Ω	0Ω
V 3	6X4	380Ω	INF	.1Ω	0Ω	INF	380Ω	100KΩ		

MEASUREMENTS IN UHF POSITION
* MEASURED FROM PIN 3 OF V2
† MEASURED FROM PIN 7 OF V3

1 DC voltage measurements taken with vacuum tube voltmeter, AC voltages measured at 1000 ohms per volt.
2 Socket connections are shown as bottom views.
3 Measured values are from socket pin to common negative.
4 Line voltage maintained at 117 volts for voltage readings.
5 Nominal tolerance on component values as close as possible a variation of ± 10% in voltage and resistance readings.

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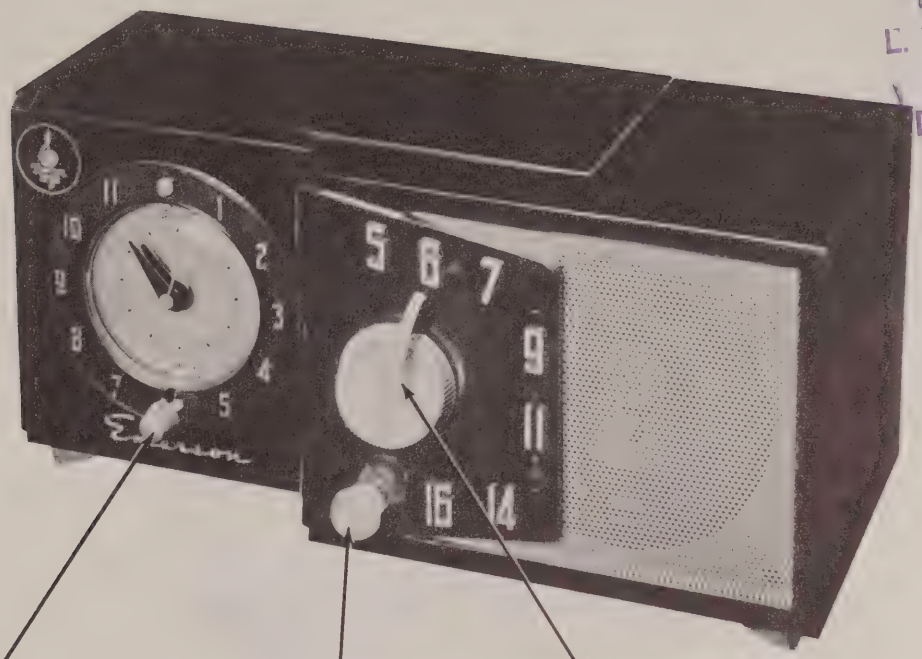
EMERSON
MODEL 788B (Ch. 120201B)



EMERSON
MODEL 788B (Ch. 120201B)

TRADE NAME	Emerson Model 788B (Ch. 120201B)
MANUFACTURER	Emerson Radio & Phono. Corp., 111 Eight Ave., New York, N. Y.
TYPE SET	AC Operated AM Superheterodyne Receiver with electric clock
TUBES	Types 12BE6, Conv., 12BA6 IF Amp., 12AT6 Det. -AVC-AF Amp., 50C5 Audio Output, 35W4 Rectifier
POWER SUPPLY	105-125 Volts AC-60 Cycles
RATING	.24 Amp. @ 117 Volts AC
TUNING RANGE—BROADCAST	540-1630KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Use isolation transformer, if available. If not, connect a .1MFD capacitor in series with low side of signal generator and B-. Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.005MFD	High side to pin 7 (grid) of 12BE6 (V1). Low side to B-.	455KC (400~ Mod)	Tuning gang fully open.	Across voice coil.	A1, A2, A3, A4	Adjust for maximum output. If isolation transformer is not used, reduce dummy antenna to .001MFD to reduce hum modulation.
2.		Loop	1630KC	"	"	A5	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
3.		"	1400KC	Tune to 1400KC signal	"	A6	"
4.		"	600KC	Tune to 600KC signal	"		Add one or two turns of slack wire to bar loop. If output decreases reverse direction of the added turn. Repeat step 2. NOTE: Do not touch loop stick when checking output. Also, the chassis should be installed in cabinet and operating at least 30 minutes before removing chassis from cabinet to perform step 4. This precaution allows loop stick to reach its normal operating temperature. Normally step 4 will not be required unless loop stick has been replaced or tampered with.

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PARTS LIST AND DESCRIPTIONS

EMERSON
MODEL 788B (Ch. 120201B)

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA: EMERSON PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RETMA BASE TYPE	NOTES
V1	Converter	12BE6	12BE6	7CH	
V2	IF Amplifier	12BA6	12BA6	7BK	
V3	Det-AVC-AF Amp.	12AT6	12AT6	7BT	
V4	Output	50C5	50C5	7CV	
V5	Rectifier	35W4	35W4	5BQ	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: EMERSON PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C1A	30	150	925218	PRS150/50-30		BBRD-5315		TCD497	TVA-2450	Red
B	50	150								Green
C2	.05	400	923554	P488-05	DF-503	CUB4S5		PT415	4TM-S5	
C3A	220									
B	2000									
C	5000		♦ 923024	♦ PA-113-1	♦ PC-150	♦ 116TM1	♦ 1408-01		♦ DT-1	
D	250									
E										
C4	.02	400	923524	P488-02		CUB4S2		PT412	4TM-S2	
C5	.05	400	923554	489ZX-05	DF-503	PJ4S5		PT415	4TM-S5	
C6	.1	400	923515	P488-1	DF-104	CUB4P1		PT401	4TM-P1	

♦ Items C3A, C3B, C3C, C3D, C3E, R5A, R5B and R5C are combined in one unit. When replacing items separately items C3D and C3E total 250MMF.

CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: EMERSON PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	500KΩ	½	390236	Q11-133	A47-500K-S	AB-59	U-50	Volume
B	Shaft		Not Req.	Not Req.	KSS-3	AK-4	Not Req.	Attach to R1A

RESISTORS

ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: EMERSON PART No.	REPLACEMENT DATA: IRC PART No.	NOTES
R2	22KΩ	½		BTS-22K	
R3	120Ω	½	340272	BTS-120	
R4	3.3Meg	½	351332	BTS-3.3Meg	
R5A	6.8Meg	½		BTS-6.8Meg	
B	470KΩ	½	♦ 923024	BTS-470K	
C	470KΩ	½		BTS-470K	

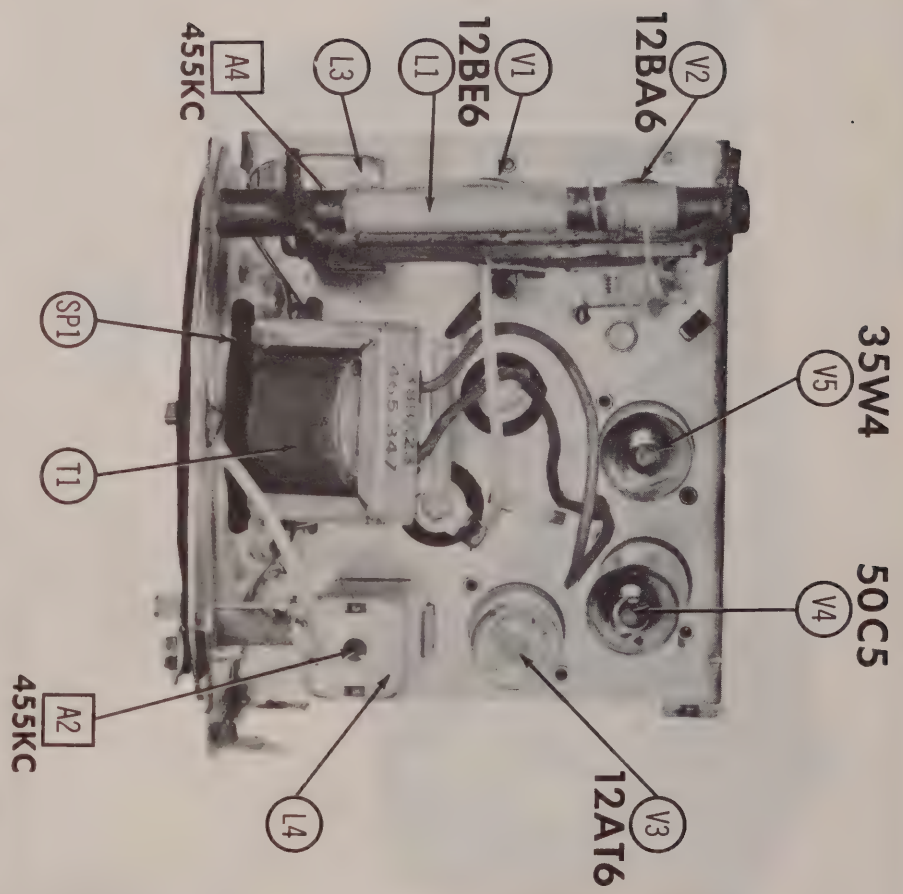
ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: EMERSON PART No.	REPLACEMENT DATA: IRC PART No.	NOTES
R6	10KΩ	½	350732	BTS-10K	
R7	150Ω	½	340292	BTS-150	
R8	1500Ω	1	380532	BTA-1500	
R9	18Ω	½	340072	BTS-18	

♦ Items R5A, R5B, R5C, C3A, C3B, C3C, C3E are combined in one unit.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE: PRI.[1]	IMPEDANCE: SEC.	REPLACEMENT DATA: EMERSON PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Halldorson PART No.	Thordarson PART No.	NOTES
T1	2.4KΩ	3.3Ω	Part of speaker	A-3332	A-3025	S-12X	Z1101		

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

SPEAKER

ITEM No.	RATINGS			REPLACEMENT DATA			NOTES
	SIZE	FIELD	V. C. IMP.	EMERSON PART No.	JENSEN PART No.	QUAM PART No.	
SP1	4"	PM	3.3Ω	180115	ST-113 Mod. P4-X	4A07	

COILS (RF-IF)

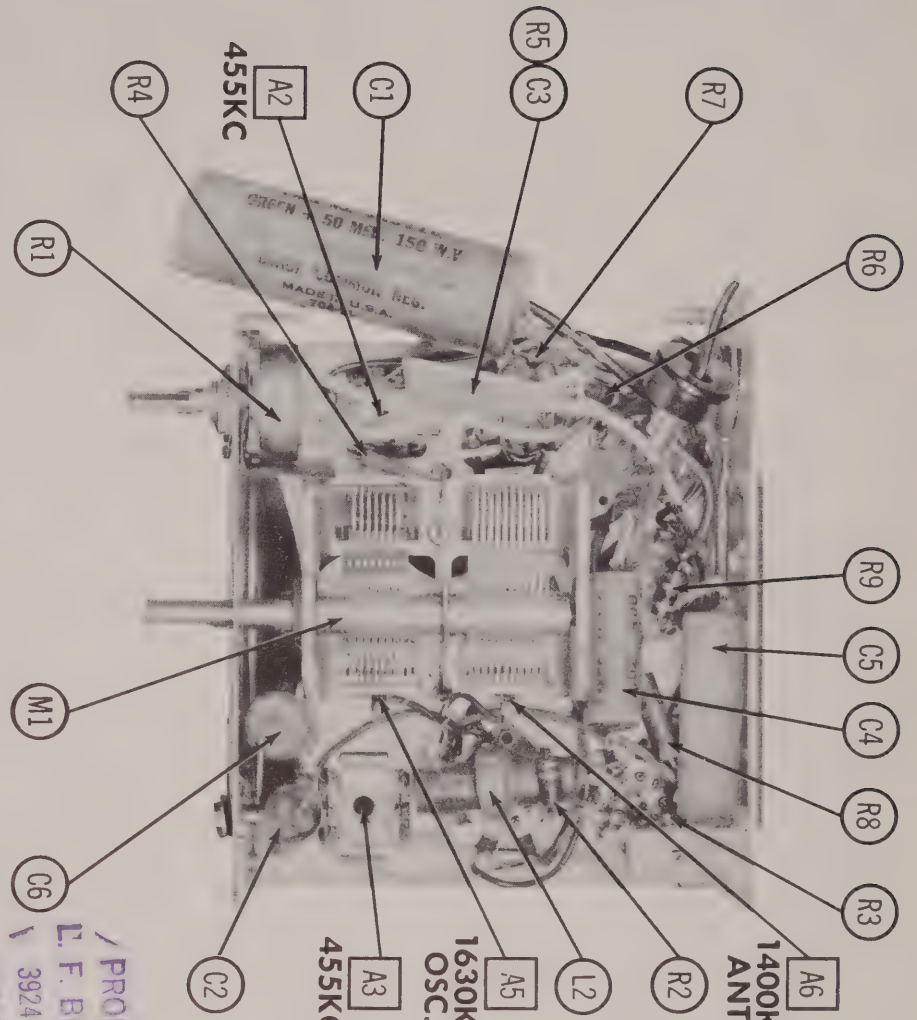
ITEM No.	USE	DC RES.		REPLACEMENT DATA				NOTES
		PRI.	SEC.	EMERSON PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L1	Ant. Coil	.5Ω		700081				
L2	Osc. Coil	.8Ω	10Ω	716071	14-1073		69-Osc. †	
L3	Input IF	17Ω	17Ω	720033	16-6758	BC-352	12-C1	
L4	Output IF	17Ω	17Ω	720033	16-6758	BC-353	12-C2	

† Drill mounting hole.

MISCELLANEOUS

ITEM No.	PART NAME	EMERSON PART No.	NOTES
M1	Tuning cap	900106	(25-350MMF) (27-155MMF)
M2	Timer assembly	470743	
	Cabinet	140553	Ebony
	Cabinet	140553B	Ivory
	Cabinet	140553A	Walnut
	Knob	460326	Pointer-gold
	Knob	460311	Volume-clear
	Knob	460509	Switch-timer-black
	Clock crystal	520195	

CHASSIS—BOTTOM VIEW



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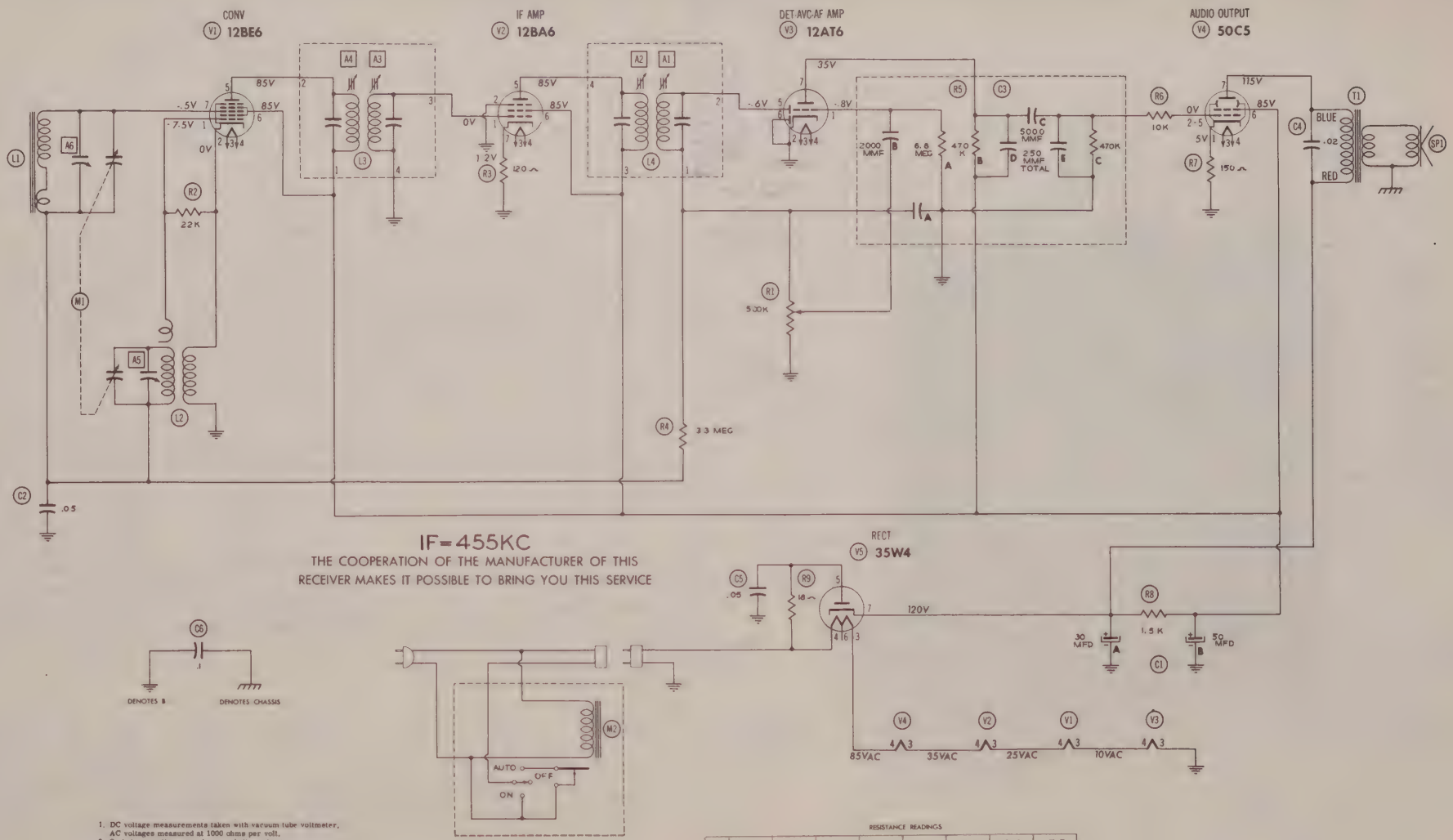

1. DC voltage measurements taken with vacuum tube voltmeter, AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V 1	12BE6	22KΩ	.06Ω	13Ω	25Ω	↑ L.5KΩ	↑ L.5KΩ	3.8 Meg
V 2	12BA6	17Ω	0Ω	25Ω	27Ω	↑ L.5KΩ	↑ L.5KΩ	130Ω
V 3	12AT6	6.8Meg	0Ω	0Ω	13Ω	900KΩ	0Ω	↑ 470KΩ
V 4	50C5	150Ω	480KΩ	37Ω	90Ω	480KΩ	↑ L.5KΩ	↑ 200Ω
V 5	35W4	INF	INF	90Ω	128Ω	145Ω	120Ω	300KΩ

↑ MEASURED FROM PIN 7 OF V5.

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FIRESTONE
MODEL 13-G-134 (Code 105-4-82203)

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RETMA MEMBER

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FIRESTONE
MODEL 13-G-134 (Code 105-4-82203)

TRADE NAME	Firestone Model 13-G-134 (Code 105-4-82203)
SUPPLIER	Firestone Tire & Rubber Co., 1200 Firestone Pkwy., Akron, Ohio
TYPE SET	Television
TUBES	Twenty-one
POWER SUPPLY	110-120 Volts AC-60 Cycle RATING 1.84 Amp. @ 117 Volts AC
TUNING RANGE	Channels 2 thru 13, Video IF 25.75MC, Sound IF 21.25MC (Intercarrier

INDEX

Alignment Instructions 6
Disassembly Instructions 18
Horizontal Sweep Circuit Adjustments 13
Parts List and Descriptions 14, 15, 16
Photographs
Cabinet-Rear View 13
Capacitor Identification 4, 9
Chassis- Top View 3
RF Tuner 10, 11
Resistor Identification 19, 20
Photographs (Cont)
Trans., Inductor & Alignment Identification 7
Resistance Measurements 8
Servicing in the Field 18
Schematic 2
Trouble Shooting Aids 12, 17
Tube Failure Check Chart 5
Tube Placement Chart (Bottom View) 8
Tube Placement Chart (Top View) 5

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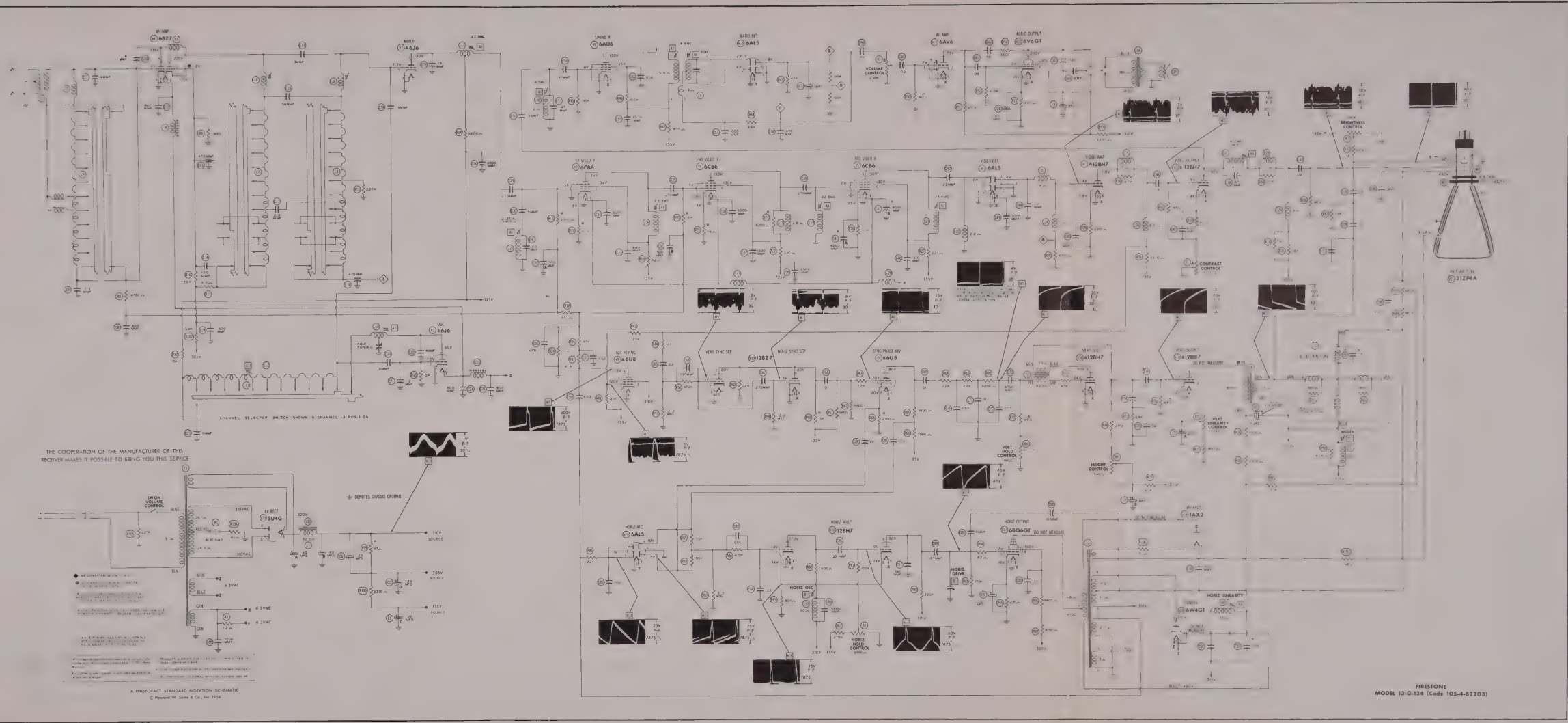
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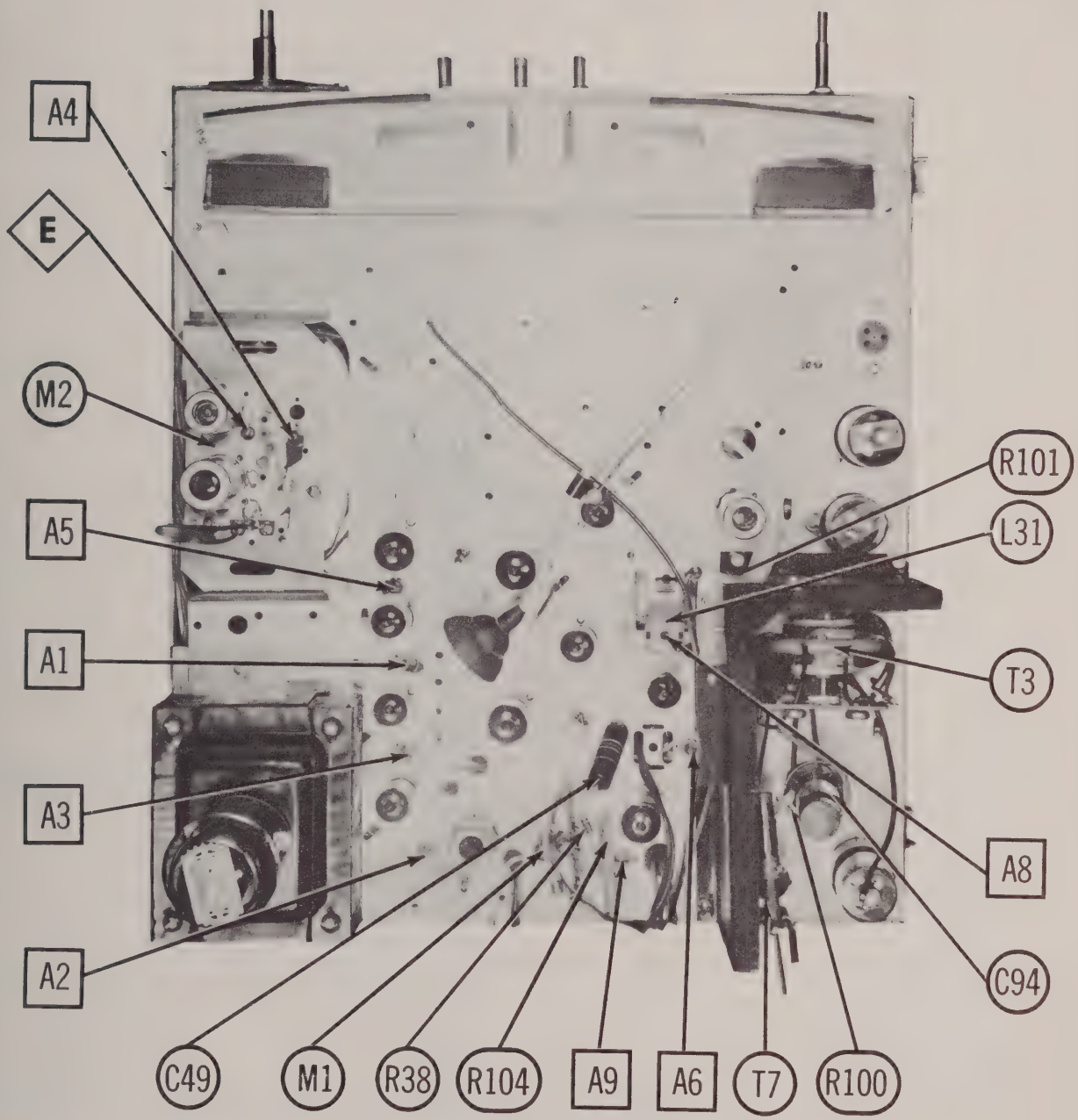
FIRESTONE
MODEL 13-G-134 (Code 105-4-82203)

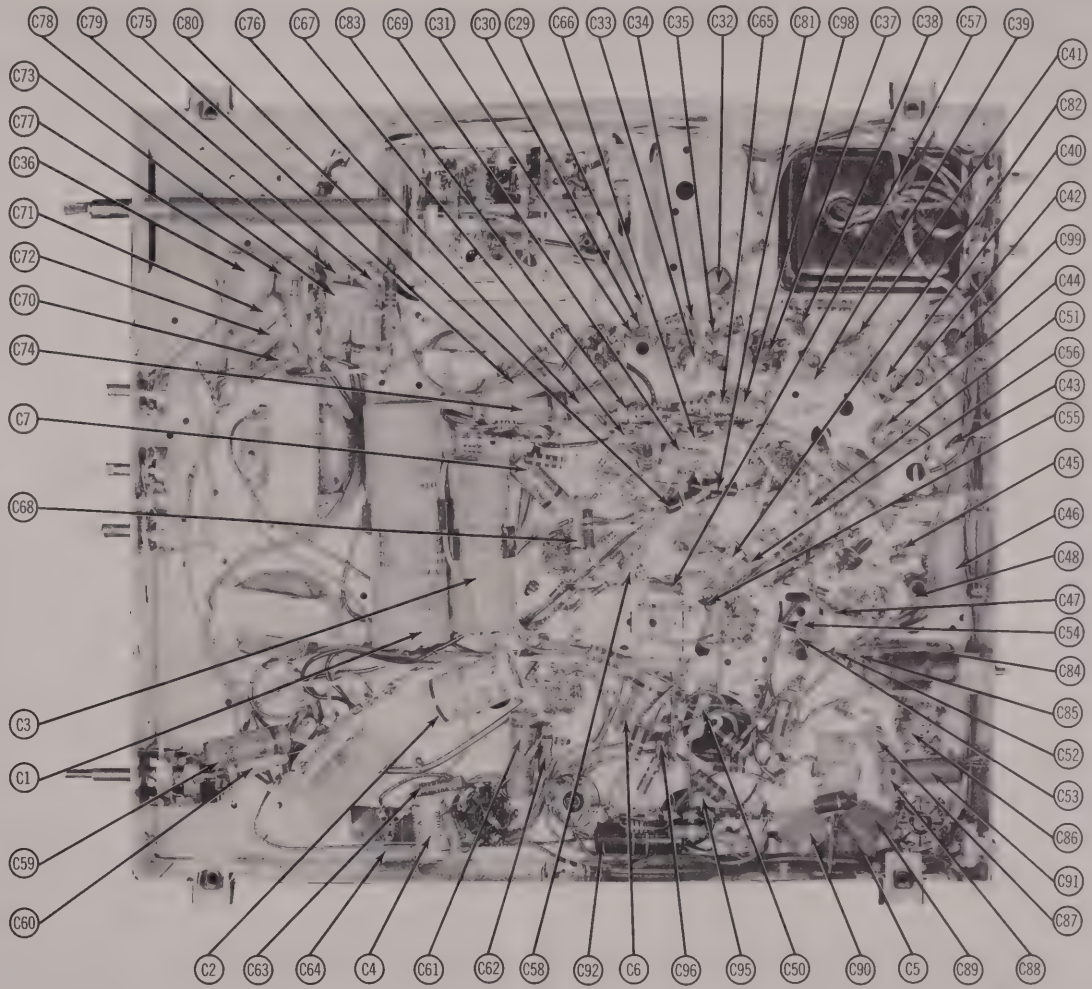
FIRESTONE
MODEL 13-G-134 (Code 105-4-82203)

PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO



CHASSIS TOP VIEW

DENVER, COLORADO



CHASSIS BOTTOM VIEW-CAPACITOR IDENTIFICATION

FIRESTONE
MODEL 13-G-134 (Code 105-4-82203)

TUBE PLACEMENT CHART

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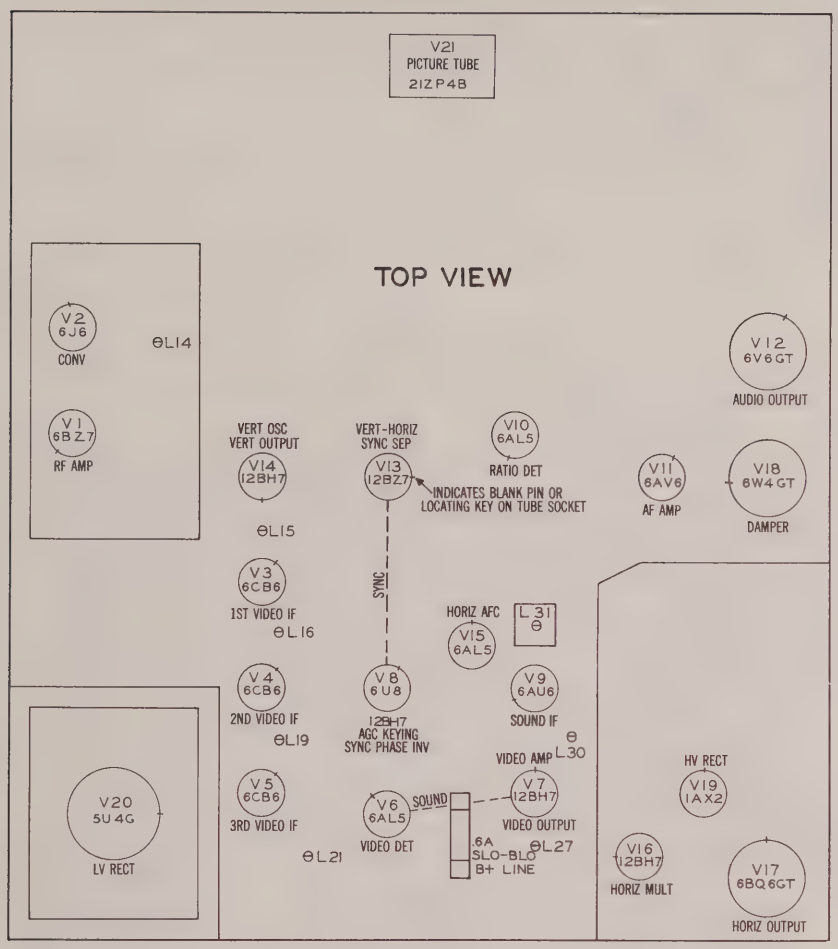


TUBE FAILURE CHECK CHART

The following chart lists tubes whose failures are most likely to produce the indicated symptoms. Refer to tube placement chart for location and type of tube.

POWER SUPPLY FAILURE
No raster, no sound - V20, Fuse (M1)

LOSS OF PICTURE OR SOUND
No pic, no sound, has raster - V2, V3, V4, V5, V6, V7
No pic, no sound, has snow - V1, V2, V3
No pic, has sound, has raster - V7, V21
Has pic, no sound - V9, V10, V11, V12
Overloaded picture - V8

SYNC FAILURE
No vert. sync - V8, V13, V14
No horiz. sync - V8, V13, V15
No vert. or horiz. sync - V8

SWEEP FAILURE
No raster, has sound - V16, V17, V18, V19, V21
No vertical deflection - V14
Poor vert. linearity or foldover - V14
Poor horiz. linearity or foldover - V16, V17, V18
Narrow picture - V16, V17, V18, V19, V20
Vert. off freq. - V8, V13, V14
Horiz. off freq. - V8, V13, V15

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

The high voltage shock hazard may be eliminated by removing the horizontal output tube (V17) from its socket.

VIDEO IF ALIGNMENT

Remove the converter tube (V2) from its socket and replace with a 6J6 which has pin 1 removed. This will disable the local oscillator and reduce the possibility of erroneous indications.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
1.	Direct	High side to an ungrounded tube shield floating over dummy converter tube. Low side to tuner chassis.	25.4MC (Unmod)	Any	DC probe thru 10KΩ to point (A). Low side to chassis.	A1, A2	Attenuate generator output to maintain approximately 3 volts on VTVM. Adjust for maximum deflection.
2.	"	"	22.8MC	"	"	A3, A4	"
3.	"	"	21.25MC	"	"	A5	Adjust for MINIMUM deflection. Increase generator output to provide usable indication on VTVM.

OVERALL VIDEO IF RESPONSE CHECK

Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection. Calibrate scope for 5 volts peak to peak deflection (approximately 1/4 of the peak voltage of the 6.3VAC filament voltage.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
4.	Direct	High side to an ungrounded tube shield floating over dummy converter tube. Low side to chassis.	24MC (10MC Swp)	21.25MC 25.75MC	Any	Vert. Amp. thru 10KΩ to point (A). Low side to chassis.		Check for response curve similar to Fig.1. If necessary, retouch A1 thru A5 to obtain desired response.

SOUND IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

Connect two matched 100KΩ (±1%) resistor in series from point (B) to chassis. The junction of these two resistors is alignment point (D) as shown on the schematic.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
5.	.01MFD	High side to point (A). Low side to chassis.	4.5MC (Unmod)	Any	DC probe to point (B). Common to chassis.	A6, A7	Attenuate generator output to maintain approximately 5 volts on VTVM. Adjust for maximum deflection.
6.	"	"	"	"	DC probe to point (C). Common to point (D).	A8	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting.

SOUND IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use frequency modulated signal with 60% modulation and 450KC sweep. Use 120% sawtooth voltage in scope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
5.	Direct	High side to point (A). Low side to chassis.	4.5MC (450KC Swp)	4.5MC	Any	Vert. Amp. to point (B). Low side to chassis.	A6, A7	Disconnect stabilizing capacitor C7. Adjust for curve of maximum amplitude and symmetry similar to Fig.2.
6.	"	"	"	"	"	Vert. Amp. to point (C). Low side to chassis.	A8	Reconnect stabilizing capacitor C7. Adjust so that 4.5MC occurs at center of crossover lines as in Fig.3. SLIGHTLY retouch A7 for maximum amplitude and straightness of crossover lines.

4.5MC TRAP ALIGNMENT

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
7.	.01MFD	High side to pin 2 (grid) of picture tube. Low side to chassis.	4.5MC (Unmod)	Any	DC probe to point (B). Common to chassis.	A9	Adjust for MINIMUM deflection.

OSCILLATOR ALIGNMENT

If all channels are not within the range of the fine tuning control, adjust A10 (high band) or A11 (low band) oscillator adjustments for clearest picture and best sound. Set the fine tuning control to its mid-range position before adjusting either A10 or A11.

RF AND MIXER ALIGNMENT

The RF and mixer portions of this receiver has been properly aligned at the factory and is very stable. Alignment of this portion of the receiver should not be required in the field.

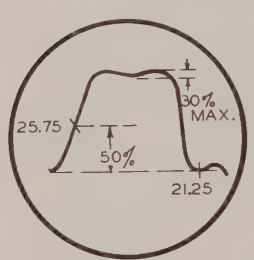


FIG.1

FIG.2

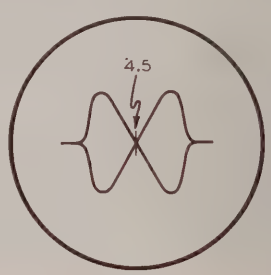
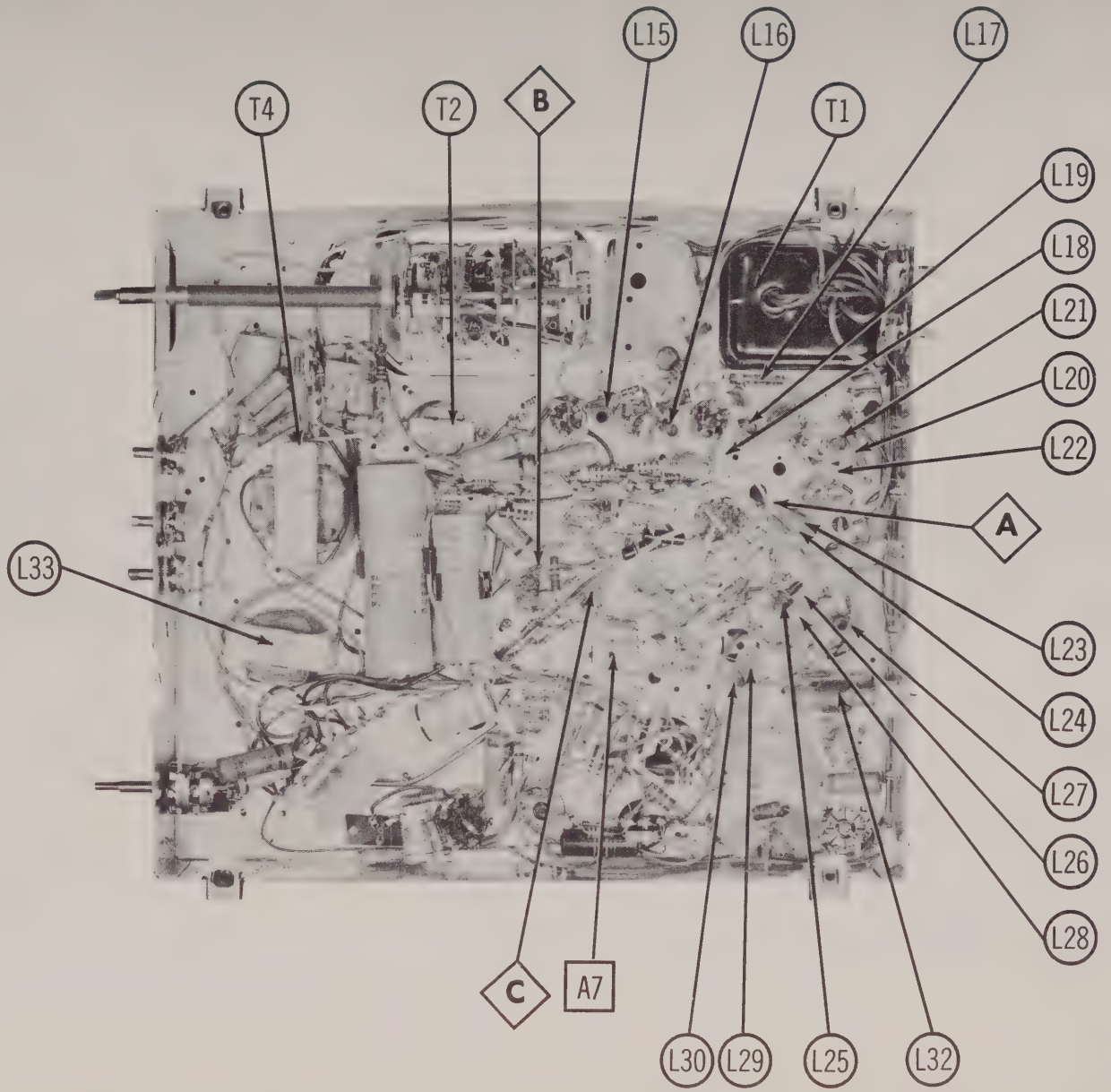


FIG. 3



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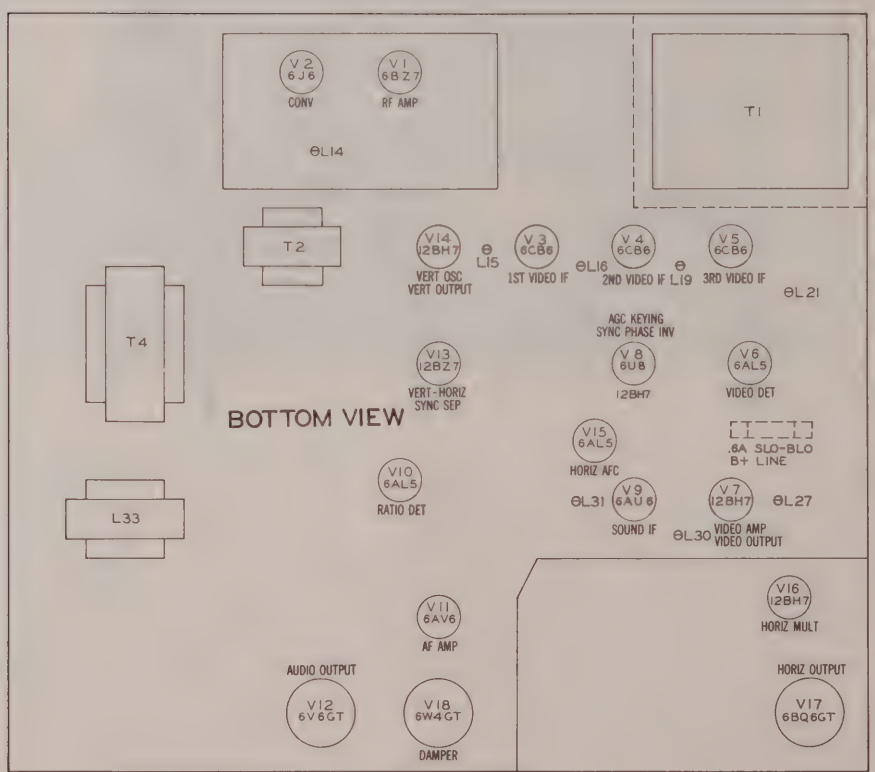
3974 MEADE ST.
DENVER, COLORADO

CHASSIS BOTTOM VIEW-TRANS., INDUCTOR AND ALIGNMENT IDENTIFICATION

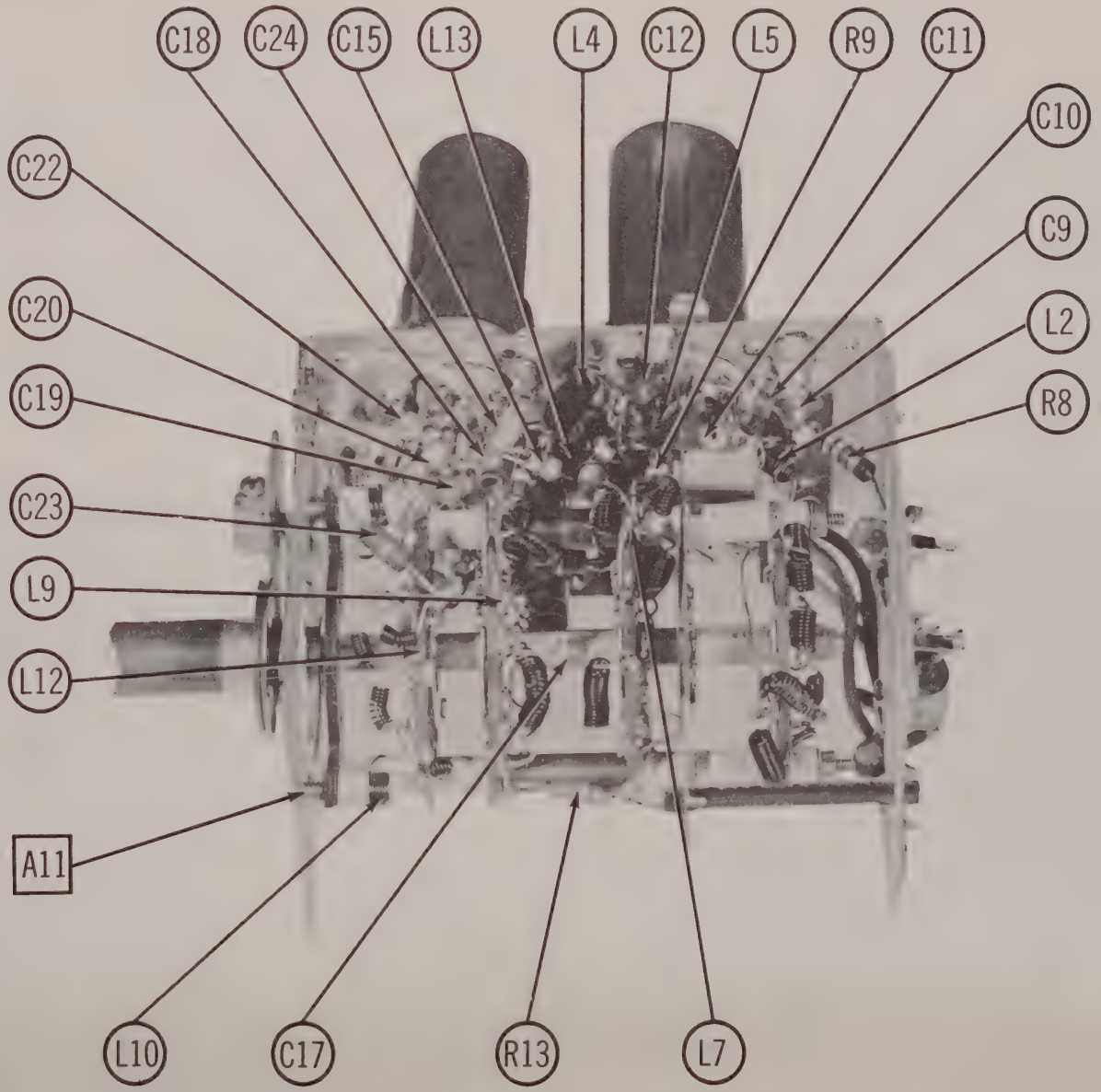
RESISTANCE MEASUREMENTS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	6BZ7	†4.5KΩ	440KΩ	INF	.1Ω	0Ω	INF	105KΩ	0Ω	0Ω
V 2	6J6	†12.4KΩ	†5.7KΩ	0Ω	.1Ω	220KΩ	15KΩ	0Ω		
V 3	6CB6	103KΩ	47Ω	.1Ω	0Ω	†2.5KΩ	†2.5KΩ	0Ω		
V 4	6CB6	110KΩ	56Ω	.1Ω	0Ω	†2.6KΩ	†2.6KΩ	0Ω		
V 5	6CB6	.3Ω	150Ω	.1Ω	0Ω	†2.6KΩ	†2.6KΩ	0Ω		
V 6	6AL5	2.8Ω	0Ω	0Ω	.1Ω	INF	0Ω	4.7KΩ		
V 7	12BH7	†4.7KΩ	4.7KΩ	220Ω	.1Ω	.1Ω	†6.9KΩ	1Meg	3.5KΩ	0Ω
V 8	6U8	†10.2KΩ	†25.4KΩ	75Ω	0Ω	.1Ω	195KΩ	†2.7KΩ	2.7KΩ	550KΩ
V 9	6AU6	100KΩ	0Ω	0Ω	.1Ω	†4.2KΩ	†105KΩ	0Ω		
V 10	6AL5	INF	INF	.1Ω	0Ω	0Ω	0Ω	47KΩ		
V 11	6AV6	10Meg	0Ω	.1Ω	0Ω	0Ω	0Ω	†473KΩ		
V 12	6V6GT	INF	0Ω	†3.7KΩ	†3.3KΩ	470KΩ	†565KΩ	.1Ω	330Ω	
V 13	12BZ7	†17KΩ	2.2Meg	0Ω	0Ω	0Ω	†17KΩ	2.7Meg	0Ω	.1Ω
V 14	12BH7	▲8.2KΩ	1.5Meg	3KΩ	0Ω	0Ω	†2.8Meg	2.3Meg	0Ω	.1Ω
V 15	6AL5	3.4Meg	3.4Meg	0Ω	.1Ω	22KΩ	0Ω	22KΩ		
V 16	12BH7	†5.7KΩ	3.8Meg	1.8KΩ	.1Ω	.1Ω	†220KΩ	130KΩ	1.8KΩ	0Ω
V 17	6BQ6GT	470KΩ	0Ω	INF	†11.6KΩ	470KΩ	INF	.1Ω	220Ω	TOP CAP ▲40Ω
V 18	6W4GT	†75Ω	INF	1.4Meg	INF	†90Ω	INF	▲.3Ω	▲0Ω	
V 19	1AX2		PINS	1 - 8	HAVE	INF	RESISTANCE			TOP CAP ▲458Ω
V 20	5U4G	INF	25KΩ	INF	86Ω	INF	85Ω	INF	25KΩ	
V 21	21ZP4	0Ω	1Meg	Pin 10 ▲330KΩ	Pin 11 †150KΩ	Pin 12 .1Ω				

† MEASURED FROM PIN 8 OF V20
▲ MEASURED FROM PIN 3 OF V18



TUBE PLACEMENT CHART



RF TUNER-RIGHT SIDE

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FIRESTONE
MODEL 13-G-134 (Code 105-4-82203)
RF TUNER-LEFT SIDE

TROUBLE SHOOTING AIDS

SWEEP

HORIZONTAL

LOSS OF SWEEP

Follow procedure outlined under "Loss of High Voltage".

INSUFFICIENT SWEEP

Check by substitution V16, V17, V18 and V20. Adjust B2 and B3. Adjust B4 if incorporated in this set. Check T3, T5A, C5, R96, R97 and other associated components.

DRIVE LINES

Adjust B2. Check by substitution V17 and V18. Check C88, C6, R99, R93 and other associated components.

COMPRESSED LEFT SIDE

Adjust B2 and B3. Adjust B4 if incorporated in this set. Check by substitution V16, V17, V18 and V20. Check components associated with the horizontal output and damper stages for failure or change of value.

FOLDS

Follow procedure outlined under "Drive Lines".

PIE CRUST EFFECT

Check by substitution V16, V17 and V18. Check C84 for open.

XMAS TREE EFFECT

Check by substitution V16, V17 and V18. Check C88, C86, C85, L32 and other associated components. Check T3 and T5A for internal arcing.

VERTICAL

LOSS OF SWEEP

Check by substitution V14. Check waveform W11.

If Satisfactory	If Unsatisfactory
Check T4, T5B, R78, R79, C77 and other associated components.	Check T2, C76, C3B, R74, R6 and other associated components.

INSUFFICIENT SWEEP

Substitute V14. Check height and vertical linearity controls for proper adjustment. Proceed as outlined under "Loss of Sweep".

COMPRESSED AT BOTTOM

Substitute V14. Check T2, T4, T5B, C74, C75, R73 and other associated components.

COMPRESSED AT TOP

Substitute V14. Check C3A, R77, R5 and other associated components.

FOLDS

Substitution V14. Check C74, C75, R73 and other associated components.

SYNC

LOSS OF VERTICAL AND HORIZONTAL SYNC

Check by substitution V8 and V13. Check C65, C68, R44, R64, R66, R65 and other associated components.

LOSS OF VERTICAL SYNC-HORIZONTAL SYNC SATISFACTORY

Substitute V14. Check waveform W9.

If Satisfactory	If Unsatisfactory
Check T2, R72, R4, R71 and other associated components.	Check vertical integrator network and other associated components. Check video IF alignment for overloading.

LOSS OF HORIZONTAL SYNC-VERTICAL SYNC SATISFACTORY

Check by substitution V15 and V16. Check waveform W14.

If Satisfactory	If Unsatisfactory
Check C83, L32, C85 and other associated components.	Check C80, C81, R84, R85 and other associated components.

HORIZONTAL BENDING

Check by substitution V8, V13, V15 and V16. Check horizontal AFC network for component failure or change of value.

VIDEO

LOSS OF VIDEO

Check L27, L28, R34, R38, C48 and C49. Check picture tube and other associated components.

SOUND BARS (4.5MC BEAT)

Adjust tuner fine tuning for best sound and picture. Check adjustment A9 and video IF alignment.

POOR CONTRAST

Check by substitution V6, V7 and V8. Check video detector network. Check contrast control, picture tube and other associated components.

NEGATIVE PICTURE

Check by substitution V3, V4, V5, V6, V7 and V8. Check video detector network. Check picture tube.

SMEAR

Substitute V7. Check L22, L23, L24, L25, L28, L26, C48, R34 and other associated components.

WIDE BLACK BAR ACROSS PICTURE

Check by substitution V1, V3, V4, V5, V6 and V7 for heater to cathode leakage.

AUDIO

WEAK OR NO SOUND

Check by substitution V9, V10, V11 and V12. Check stages V11 and V12 using audio signal generator. Apply audio signal across R1B.

If Satisfactory	If Unsatisfactory
Check ratio detector and audio IF alignment. Check components associated. with ratio detector and audio IF stages.	Check C60, C62, C61, C63, R55, R51, T8, speaker and other associated components.

DISTORTED

Follow procedure outlined under Weak or No Sound.

BUZZ

Adjust tuner fine tuning for best sound and picture. Check adjustment A8 for minimum buzz. If still unsatisfactory check alignment of audio IF stages.

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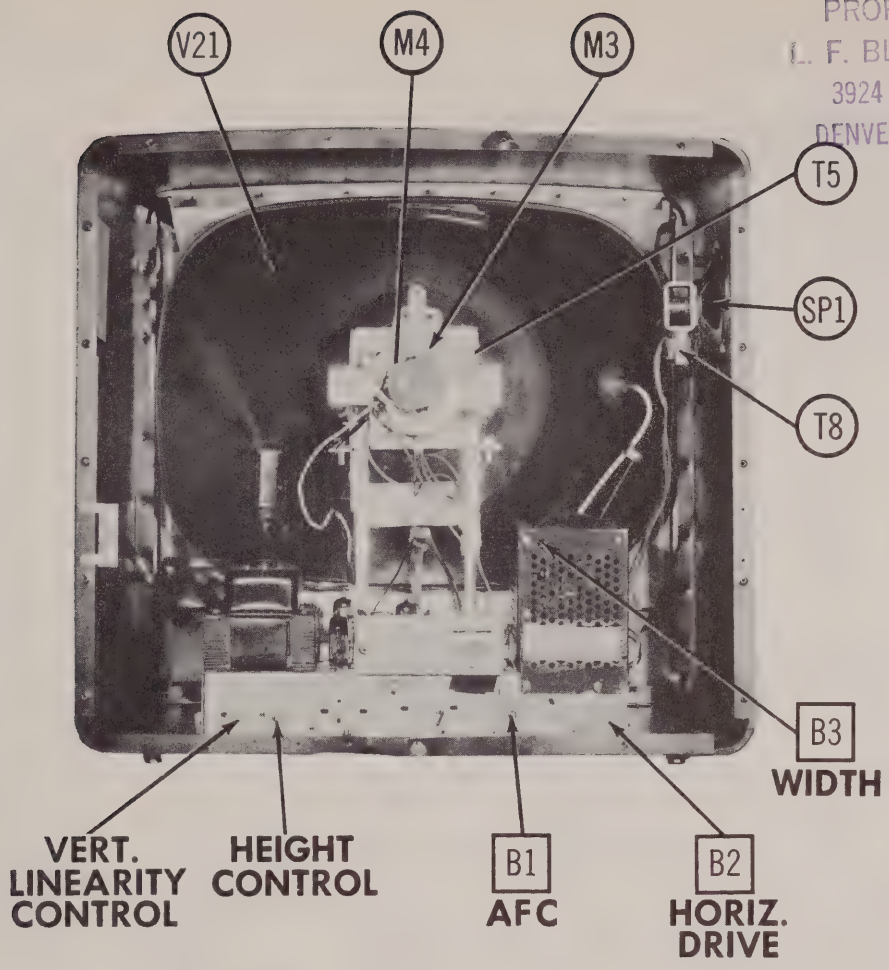


CABINET—REAR VIEW

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

Turn the set on and tune in a TV station, preferably a test pattern.

If the horizontal hold control fails to maintain sync, set it to its mid-range position and adjust the horizontal oscillator slug (B1) until the picture synchronizes. Check on other channels and, if necessary, SLIGHTLY retouch B1 for best pull-in on all channels.

Adjust the horizontal drive trimmer (B2) counter clockwise as far as possible without the presence of vertical white lines or compression near the center of the picture.

Adjust the width coil slug (B3) for a picture that is SLIGHTLY wider than necessary to fill the picture mask horizontally.

On sets that use a horizontal linearity coil, adjust the slug for a symmetrical picture from left to right.

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA: FIRESTONE PART No.	STANDARD REPLACEMENT	RETMA BASE TYPE	NOTES
V1	RF Amplifier	6BZ7	6BZ7	9AJ	
V2	Converter	6J6	6J6	7BF	
V3	1st. Video IF Amp.	6CB6	6CB6	7CM	
V4	2nd. Video IF Amp.	6CB6	6CB6	7CM	
V5	3rd. Video IF Amp.	6CB6	6CB6	7CM	
V6	Video Detector	6AL5	6AL5	6BT	
V7	Video Amplifier - Video Output	12BH7	12BH7	9A	Early versions employed 12BH7 as phase inv. and sync amplifier . In later versions the sync amplifier was omitted and the AGC keyer is used.
V8	AGC Keying- Sync Phase Inv.	6U8	6U8	9AE	
V9	Sound IF Amp.	6AU6	6AU6	7BK	
V10	Ratio Detector	6AL5	6AL5	6BT	
V11	AF Amplifier	6AV6	6AV6	7BT	
V12	Audio Output	6V6GT	6V6GT	7S	
V13	Vert. Sync Sep.- Horiz. Sync Sep.	12BZ7	12BZ7	9A	
V14	Vert. Osc.- Vert. Output	12BH7	12BH7	9A	
V15	Horiz. AFC	6AL5	6AL5	6BT	
V16	Horiz. Mult.	12BH7	12BH7	9A	
V17	Horiz. Output	6BQ6GT	6BQ6GT	8AM	
V18	Damper	6W4GT	6W4GT	4CG	
V19	HV Rectifier	1AX2	1AX2	9T	
V20	LV Rectifier	5U4G	5U4G	5T	

CATHODE-RAY TUBE

ITEM No.	REPLACEMENT DATA: FIRESTONE PART No.	C&S-HYTRON PART No.	GENERAL ELECTRIC PART No.	SYLVANIA PART No.	WESTINGHOUSE PART No.	RETMA BASE TYPE	NOTES
V21	21ZP4A	21ZP4A 21ZP4B	21ZP4A 21ZP4B	21ZP4A 21ZP4B 21ZP4 ①	21ZP4A 21ZP4B	I2N I2N I2D	① Circuit changes necessary

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	VOLT	FIRESTONE PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C1A	40	450	PA20144	PRS450/40-40		D121		FP447	TVL-4774	Red Blue Orange
B	40	450		PRS450/30-30						Green
C	20	450								Note 1
D	20	450		E26C218						
C2	5	350	PA20174	AFH3-156		C122	{*TC2 TC3	FP351	TVL-2750	Yellow
C3A	100	50	PA20175				TC3501		TVA-1310	Blue
B	10	450								Red
C	10	450								
C4	50	25	PA20182	PRS25/50		BR502		TC29	TVA-1206	
C5	10	25	PA20137	PRS25/10		BR102		TC32	TVA-1204	
C6	25	25	PA20147	PRS25/25		BR252		TC36	TVA-1205	
C7	1	100	PA20181	PRS350/4		BR415		TC40	TVA-1402	
C8	800			BPD-0008	DD-801	K069	801-001	DC-521	5HK-D1	
C9	10									
C10	1.6									
C11	4									
C12	800			BPD-0008	DD-801	K069	801-001	DC-521	5HK-D1	
C13	470									
C14	100			SI100	D6-101	TP24	GP1K-101	UC-531	5GA-T1	
C15	.3									
C16	.56									
C17	3.2									
C18	470									
C19	.3									
C20	10			SI10N750	TCN-10	TN01	N750K-100	NT-541	5TCU-Q1	
C21	12									
C22A	1500		PA19147	BPD-2X0015	DD2-152	ED271	812-0015	DCD-5215	5HK-2D15	
B	1500									
C23	5			SI5NP0	TCZ-4.7	TZ07	MP0K-050	DZ-555	5TCCB-V47	
C24	800			BPD-0008	DD-801	K069	801-001	DC-521	5HK-D1	
C25	15			SI15	D6-150	TP11	GP1K-150	UC-5415	5GA-Q5	
C26	5000			BPD-005	DD-502	K060	811-005	DC-525	5HK-D5	
C27	800			BPD-0008	DD-801	K069	801-001	DC-521	5HK-D1	
C28	800			BPD-0008	DD-801	K069	801-001	DC-521	5HK-D1	
C29	270	500	PE190-123	1468-0003	D6-271	5WT27	GP2K-271	MC541	1FM-33	
C30	5		PE555-100	SI5NP0	TCZ-4.7	TZ07	MP0K-050	DZ-555	5TCCB-V47	
C31	100	500		1468-0001		3ZR571		MC3151	MS-31	
C32A	1500		PA19147	BPD-2X0015	DD2-152	ED271	812-0015	DCD-5215	5HK-2D15	
B	1500									
C33	800	500	PE556-234			5WT68				
C34	5000		PA19109	BPD-005	DD-502	K060	811-005	DC-525	5HK-D5	
C35	270	500	PE190-123	1468-0003	D6-271	5WT27	GP2K-271	MC541	1FM-33	
C36	1.0	100	PE194-A21	484-1.0		CUBZW1		PT41	5TM-M1	
C37	1500		PA19148	BPD-0015	DD-152	K071	801-0015	DC-5215	5HK-D15	
C38	5000		PA19109	BPD-005	DD-502	K060	811-005	DC-525	5HK-D5	
C39	270	500	PE190-123	1468-0003	D6-271	5WT27	GP2K-271	MC541	1FM-33	
C40	510	500	PE190-140			5WT51				
C41A	4000			BPD-2X004	D6-402 D6-403	2ZR5Q22	822-004	DCD-524	5HK-4D4	Note 3
B	4000									
C42	22	500	PE190-107	1468-000025		2ZR5Q22		MCB220	MS-425	
C43	5000		PA19109	BPD-005	DD-502	K060	811-005	DC-525	5HK-D5	
C44	10		PE555-100	SI5NP0	TCZ-10	TZ09	MP0K-100	ZT-541	5TCC-Q1	
C45	1000		PE555-100	SI1000	D6-102	TP53	GP2L-102	UC-531	5HK-D1	
C46	.05	600	PR194-A160	PS68-05	DF-503	CUBG85		PT615	5TM-S5	
C47	820		PP1901			5WT82				
C48	47			SI47NP0	TCZ-47	TZ23	MP0K-470	ZT-5447	5TCC-Q47	
C49	.047	600	PE197-100	PS68-047	DF-503	CUBG847		PT6147	6TM-S47	
C50	.002	500	PE194-A146	PS68-002	D6-202	CUBGD2	GP2-333-202	PT622	6TM-D2	
C51	.002	600	PR194-A146	PS68-002	D6-202	CUBGD2	GP2-333-202	PT622	6TM-D2	
C52	5		PE555-100	SI5NP0	TCZ-4.7	TZ07	MP0K-050	DZ-555	5TCCB-V47	
C53	47			SI47NP0	TCZ-47	TZ23	MP0K-470	ZT-5447	5TCC-Q47	
C54	47		PE555-113-2	SI47NP0	TCZ-47	TZ23	MP0K-470	ZT-5447	5TCC-Q47	
C55	1500		PA19148	BPD-0015	DD-152	K071	801-0015	DC-5215	5HK-D15	

CAPACITORS (cont)

ITEM No.	RATING: CAP.	VOLT	FIRESTONE PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C56	.005	600	PE194-A151	PS68-005	D6-502	CUBGD5	GP2-333-502	PT625	6TM-D5	
C57	1000		PE556-238	SI1000	D6-102	TP53	GP2L-102	UC-531	5HK-D1	
C58	470	500	PE556-231	1468-0005		D6-471	5WS747	GP2K-471	MC345	1FM-35
C59	.05	600	PE194-A150	PS68-05		DF-503	CUBG85		PT615	5TM-S5
C60	.02	600	PE194-A156	PS68-02		DF-203	CUBG823	S17-02	PT612	6TM-S23
C61	.05	600	PE194-A150	PS68-05		DF-503	CUBG85		PT615	5TM-S5
C62	.001	600	PE194-A155	PS68-001		D6-102	CUBGD1	GP2L-102	PT621	6TM-D1
C63	.001	600	PE194-A145	PS68-001		D6-102	CUBGD1	GP2L-102	PT621	6TM-D1
C64	.005	600	PE194-A151	PS68-005		D6-502	CUBGD5	GP2-333-502	PT625	6TM-D5
C65	.02	600	PE194-A156	PS68-02		DF-203	CUBG82	S17-02	PT612	6TM-S23
C66	390	500	PE190-137	1469-0004			5R5739		MCE243	MS-34
C67	390	500	PE190-137	1469-0004			5R5739		MCE241	MS-33
C68	.01	600	PE194-A155	PS68-01		D6-103	CUBG81	GP2-333-103	PT611	6TM-S1
C69	.01	600	PE194-A155	PS68-01		D6-103	CUBG81	GP2-333-103	PT611	6TM-S1
C70	.005	600	PE194-A151	PS68-005		D6-502	CUBGD5	GP2-333-502	PT625	6TM-D5
C71	.01	600	PE194-A155	PS68-01		D6-103	CUBG81	GP2-333-103	PT611	6TM-S1
C72	.005	600	PE194-A151	PS68-005		D6-502	CUBGD5	GP2-333-502	PT625	6TM-D5
C73	4700	500	PE190-183	1464-005			1R5D47		MCE445	MS-35
C74	.035	600	PE194-A159							
C75	.02	600	PE194-A156	PS68-02		DF-203	CUBG82	S17-02	PT612	6TM-S23
C76	.005	600	PE194-A160	PS68-05		DF-503	CUBG85		PT615	5TM-S5
C77	.1	600	PE194-A163	PS68-1		DF-104	CUBG91		PT601	6TM-S1
C78	.05	600	PE194-A160	PS68-05		DF-503	CUBG85		PT615	5TM-S5
C79	05	600	PE194-A160	PS68-05		DF-503	CUBG85		PT615	5TM-S5
C80	.001	600	PE194-A145	PS68-001		D6-102	CUBGD1	GP2L-102	PT621	6TM-D1
C81	.001	600	PE194-A145	PS68-001		D6-102	CUBGD1	GP2L-102	PT621	6TM-D1
C82	.005	600	PE197-151	PS68-005		D6-503	CUBGD5	GP2-333-502	PT625	6TM-D5
C83	.005	600	PE197-151	PS68-005		D6-503	CUBGD5	GP2-333-502	PT625	6TM-D5
C84	.05	100	PE194-A180	PS68-05		DF-503	CUBG85		PT615	6TM-S5
C85	3900	500	PE195-261	1464-004			1R5D39		MCE244	MS-36
C86	390	500	PE190-137	1469-0004			5R5739		MCE243	MS-39
C87	390	500	PE190-137	1469-0004			5R5739		MCE243	MS-39
C88	390	500	PE190-137	1469-0004			5R5739		MCE243	MS-39
C89	5	2500	PP1945						MCP550	
C90	10	2500	PP1965	HVD30-00001				3KV-100	MCP410	30GA-Q4
C91	.05	600	PE197-180	PS68-05		DF-503	CUBG85		PT615	6TM-S5
C92	.1	600	PE197-182	PS68-1			CUBAP1		PT601	6TM-P1
C93	.05	600	PE197-180	PS68-05			CUBG85		PT615	6TM-S5
C94	500	20000	PA1998-3	HY20C		TV3-502	MMU30T5	413	HV20035A	20DK-T5
C95	10	2500		HVD30-00001				3KV-100	MCP410	30GA-Q4
C96	22	1500	PE19233	HVD15-000022				2KV-470	MCM422	20GA-Q22
C97	47	2000						3KV-470		20GA-Q47
C98	5000		PA19109	BPD-005	DD-502	K060		811-005	DC-525	5HK-D5
C99	5000		PA19109	BPD-005	DD-502	K060		811-005	DC-525	5HK-D5

Note 1. Non-polarized unit. Replace with same type.
Note 2. Some chassis use dual 5000MMF in this application (part #PP19163).
Note 3. Not used in all models.
Note 4. Some models use 56MMF in this application.
* Connect negative leads together.

CONTROLS

ITEM No.	RATING: RESIST-ANCE	WATTS	FIRESTONE PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	5000Ω	2	PR-26143	*Q2-502	1	R17V-301		
B	250KΩ						WF53	Contrast-Panel-Wire Wound
C	Switch						UR356A	Volume-Rear
R2A	100KΩ	½	PA-24410-D	Q11-128	147-100k-8	AB-40	UB-26	Attach to R1B
B	Shaft		Not Req.	Not Req.	RS-5	AK-1	EU-41	Brightness
R3A	5000Ω	½	PA-24161-B	Q11-114	A47-5000-8	AB-10	Not Req.	Attach to R2A
B	Shaft		Not Req.	Not Req.	RS-3	AK-1	EU-14	Horiz. Hold
R4A	1Meg	½	PA-24112-C	Q11-127	A47-1Meg-8	AB-09	Not Req.	Attach to R3A
B	Shaft		Not Req.	Not Req.	RS-3	AK-1	SU-54	Vert. Hold
R5A	3000Ω	½	PA-24114-C	Q11-112	A47-3000-8	AB-8	Not Req.	Attach to R4A
B	Shaft		Not Req.	Not Req.	FRS-1/4	AK-1	U-8	Vert. Linearity
R6A	5Meg	½	PA-24116-D	Q11-141	A47-5Meg-8	AB-87	Not Req.	Attach to R5A
B	Shaft		Not Req.	Not Req.	FRS-1/4	AK-1	SU-87	Height
							Not Req.	Attach to R6A

* CONCENTRIQIT EQUIVALENT KIT K-3 BASE ELEMENTS & SHAFTS W11-114 & P3-104 (Panel)
B13-130 & R1-130 (Rear) & SWITCH T6-1.

RESISTORS

ITEM No.	RATING: OHMS	WATTS	FIRESTONE PART No.	IRC PART No.	NOTES
R1	1.2Ω	½	PR33181		
R2	4700Ω	½		BTS-4700	
R3	1Meg	½		BTS-1Meg	
R4	750KΩ	½		BTS-750K	
R5	470Ω	½		BTS-470	
R6	10KΩ	½		BTS-10K	
R7	220KΩ	½		BTS-220K	
R8	330KΩ	½		BTS-330K	
R9	15KΩ	½		BTS-15K	
R10	2700Ω	½	PR231-1159	BTS-2700	Note 1
R11	47Ω	½	PR231-1117	BTS-47	Note 2
R12	330Ω	½	PR231-1137	BTS-330	
R13	82Ω	½	PR231-1123	BTS-82	
R14	10KΩ	½		BTS-10K Note 3	
R15	56Ω	½	PR231-1119	BTS-56	Note 4
R22	220Ω	½	PR231-1133	BTS-220	
R23	8200Ω	½	PR231-1165	BTS-8200	Note 5
R24	100KΩ	½	PR231-1197	BTS-100K	
R25	47KΩ	½	PR231-1153	BTS-47K	
R26	150Ω	½	PR231-1129	BTS-150	
R27	220Ω	½	PR231-1133	BTS-220	
R28	4700Ω	½	PR231-1165	BTS-4700	
R29	220Ω	½	PR231-1133	BTS-220	
R30	4700Ω	½	PR231-1165	BTS-4700	
R31	330Ω	1	PR232-1161		
R32	1Meg	½	PR231-1231	BTS-1Meg	
R33	1800	½	PR231-1131	BTS-180	

RESISTORS (cont)

ITEM No.	RATING: OHMS	WATTS	FIRESTONE PART No.	IRC PART No.	NOTES
R34	10KΩ	½	PR231-1173	BTS-10K	
R35	11KΩ 5%	2	PR233-74		
R36	18KΩ	2	PR233-1178		
R37	100KΩ	½		BTS-100K	Note 6
R38	1Meg	½	PR231-1221	BTS-1Meg	
R39	680KΩ	½	PR232-1217	BTA-680K	
R40	680KΩ	½	PR232-1217	BTA-680K	
R41	47KΩ	½	PR231-1169	BTS-47K	
R42	330KΩ	½	PR231-1185	BTS-33K	
R43	47KΩ	½	PR231-1169	BTS-47K	
R44	12KΩ	½	PR231-1175	BTS-12K	
R45	100KΩ	½	PR231-1197	BTS-100K	
R46	100KΩ	½	PR231-1197	BTS-100K	
R47	1800Ω	½	PR231-1155	BTS-1800	
R48	39KΩ	½	PR231-1167	BTS-39K	
R49	47KΩ	½	PR231-1169	BTS-47K	
R50	10Meg	½	PR231-1245	BTS-10Meg	
R51	470KΩ	½	PR231-1213	BTS-470K	
R52	470KΩ	½	PR231-1213	BTS-470K	
R53	330Ω	1	PR232-1157	BTA-330	
R54	560KΩ	½	PR231-1215	BTS-560K	
R55	3250Ω	7			
R56	470KΩ	½	PR231-1213	BTA-470K	
R57	2.2Meg	½	PR231-1239	BTS-2.2Meg	
R58	15KΩ	1		BTA-15K	Note 7
R59	2.2Meg	½	PR231-1239	BTS-2.2Meg	
R60	22KΩ	1	PR232-1181	BTA-22K	

RESISTORS (cont)

ITEM No.	RATING: OHMS	WATTS	FIRESTONE PART No.	IRC PART No.	NOTES
R84	100KΩ	1	PR232-1197	BTS-100K	
R85	100KΩ	½	PR231-1221	BTS-100K	
R86	22KΩ	1	PR232-1181	BTA-22K	
R87	3.3Meg	½	PR231-1233	BTS-3.3Meg	
R88	470KΩ	1	PR231-1213	BTA-470K	
R89	180Ω	1	PR232-1153	BTA-180	
R90	5600Ω	1	PR231-1207	BTS-5600	
R91	100KΩ	1	PR231-1197	BTS-100K	
R92	220KΩ	1	PR231-1205	BTS-220K	
R93	470KΩ	½	PR231-1213	BTS-470K	
R94	82Ω	1	PR231-1123	BTS-82	
R95	220Ω	2	PR233-1133	BTA-220	
R96	6800Ω	2	PR233-1169	BTB-6800	
R97	4700Ω	2	PR233-1165	BTB-4700	
R98	3300Ω	2	PR233-1165	BTB-4700	
R99	47Ω	2		BTB-47	Note 8
R100	51Ω	2	PR23163		
R101	1Meg	2	PR233-2221	BTB-1Meg	
R102	3900Ω	2	PR233-1161	BTB-3900	
R103	2250Ω	15	PR233-1161	BTB-3300	
R104	80Ω	10		PC21J34-2	
R105	220KΩ	1	PR232-1205	BTA-220K	

Note 1. Some chassis may use a 2900Ω resistor in this application.
Note 2. Some chassis may use 33Ω resistor in this application.
Note 3. Some chassis may use a 10KΩ resistor in this application.
Note 4. Some chassis may use a 47Ω resistor in this application.
Note 5. Some chassis may use a 56KΩ resistor in this application.
Note 6. Some chassis may use a 270KΩ resistor in this application.
Note 7. Some chassis may use a 82000 resistor in this application.
Note 8. Some chassis may use a 22Ω resistor in this application.

TRANSFORMER (POWER)

ITEM No.	RATING: PRI	SEC 1	SEC 2	FIRESTONE PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	RCA TYPE No.	Halldorson PART No.	Thordorson PART No.
T1	117VAC @1.64A	680VCT .240ADC	5VAC @ 3A	PC-10109	P-8171	P-3068	R-49BB			
	SEC 3	SEC 4	SEC 5							
	6.3VAC @1.2A	6.3VAC @.8A								

TRANSFORMERS (SWEEP CIRCUITS)

ITEM No.	USE	FIRESTONE PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	RCA TYPE No.	Halldorson PART No.	Thordorson PART No.
T2	Vert. Osc. Trans.	A10106	A-8125	A-9X	2-97X	2A3	H6326	24A82
T3	Horiz. Output Trans.	A10137 A10136 ②	A-8231 *	HVD-10 *	D-32*		FB610 *	FLY-5 *
T4	Vert. Output Trans.	A10132	A-8241 ①	A-3039 ①	A-104X ①	226T1 ①	Z1806 ①	22S54 ①
T5A	Yoke-Horiz. (6.5MΩ)	A20330	DY-8A	MDF-70	Y-12-1	206D1 ①	DF601	Y-5
B	Vert. (42MΩ)							
T6	Horiz. Lin. Coil (3.5-23MΩ)	A28292 ③	WC-1 ③	MWC-1 ③ ⑤	WC-11 ③ ⑤	215R1	RF600 ⑦ ⑧	WC-14
T7	Width Coil (.21-1.5MΩ)	A28218-1	WC-7	MWC-8 ③	WC-12 ③	206R1		

① Drill one new mounting hole.
② Alternate horizontal output transformer.
③ Connect blue lead of transformer to plate. Connect green lead of transformer to brown lead of yoke. Remove green lead of yoke from its present terminal and connect it and red lead of transformer to boosted B+ terminal to which red lead of original transformer was connected.
④ Use original yoke network.
⑤ Not used in all chassis.
⑥ Connect to shorted red and blue terminals.
⑦ Enlarge mounting hole.
⑧ Connect to terminals #1 and 4.
⑨ Connect to red and green and red terminals.

*HORIZONTAL OUTPUT TRANSFORMER CONNECTION DATA

Use Original Width Coil Unless Replacement Type is Listed

ORIGINAL TERMINAL CONNECTIONS	Stancor Replacement Connections	Merit Replacement Connections	Triad Replacement Connections	RCA Replacement Connections	Halldorson Replacement Connections	Thordorson Replacement Connections
3	3	3	3		Hi-Volt Rect Plate Lead	3
9	9	2	2		9	2
2	2	1	1		4	1
4	4	4	4		8	5
7	7	5	5		6	8
8	8	6	6		7	6
1	1	7	7		5	7
5 (NC)	5 (NC)	NC	NC		NC	NC
6	6	9	9		11	9

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE: PRI	SEC	FIRESTONE PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Halldorson PART No.	Thordorson PART No.	NOTES
T8	4.9KΩ	3.2Ω	Part of Spkr.	A-3877 ①	A-3026	S-3X ①	Z1000 ①	34S51	① Drill one new mounting hole.

PARTS LIST AND DESCRIPTIONS (Continued)

SPEAKER

ITEM No.	RATINGS			REPLACEMENT DATA			NOTES
	SIZE	FIELD	V. C. IMP.	FIRESTONE PART No.	JENSEN PART No.	QUAM PART No.	
SP1	5"	PM	3.2Ω	PC-5866 P	ST-105 Mod. P5-X	5A1	

COILS (RF-IF)

ITEM No.	USE	DC RES.		REPLACEMENT DATA				NOTES
		PRI.	SEC.	FIRESTONE PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L1	Ant. Trans.	0ΩCT	0Ω					
L2	Ant. Coil	0Ω						Channel 13
L3	Ant. Coils	0Ω						
L4	Fil. Choke	0Ω						
L5	Neutr. Coil	0Ω						
L6	RF Coil	0Ω						Channel 13
L7	RF Coils	0Ω						
L8	Mixer Grid Coil	0Ω						Channel 13
L9	Mixer Grid Coils	0Ω						
L10	Osc. Plate Coil	0Ω CT						Channel 13
L11	Osc. Coil	0Ω						Channel 6
L12	Osc. Coils	0Ω						
L13	Fil. Choke	0Ω						
L14	1st. V ideo IF	.5Ω						Tapped @ .3Ω
L15	21.25MC Trap	0Ω		A28314	20-1021 †	TV-150 ♦	6193 ♦	
L16	2nd. Video IF	.3Ω		A3392	17-1003	TV-102 ■	6188 ■	
L17	Fil. Choke	.27Ω		A28276	19-3001	TV-189	6175	.82 Microhenry IRC part #CL-1
L18	RF Choke	2.8Ω		A28253	19-3036	TV-180	6176	35 Microhenries
L19	3rd. Video IF	.3Ω		A3392	17-1004	TV-103 ■	6189 ■	
L20	Fil. Choke	.27Ω		A28276	19-3001	TV-189	6175	.82 Microhenry IRC part #CL-1
L21	4th. Video IF	.3Ω		A3392	17-1003	TV-102 ■	6188 ■	
L22	RF Choke	2.8Ω		A28253	19-3036	TV-180	6176	35 Microhenries
L23	Series Peaking Coil	9Ω		A28255-2	19-3180	TV-184	6154	194 Microhenries
L24	Shunt Peaking Coil	7Ω		A28255-1	19-3125	TV-181	6153	130 Microhenries
L25	Series Peaking Coil	7Ω		A28255-2	19-3180	TV-184	6154	194 Microhenries
L26	Shunt Peaking Coil	6.5Ω		A28255-1	19-3125	TV-181	6153	130 Microhenries
L27	4.5MC Trap	1.8Ω		A28286	20-1004	TV-151	1469	
L28	Series Peaking Coil	7.5Ω		A28255-1	19-3125	TV-181	6153	130 Microhenries
L29	Shunt Peaking Coil	13Ω		A28255-4	19-3300		6155	314 Microhenries
L30	Sound IF	2Ω		A28286	17-3400	TV-151	1469	
L31	Ratio Det.	5.4Ω	1.9Ω CT	A1201 *	17-3497	TV-115	6205	Tertiary winding -.6Ω
L32	Horiz. Osc.	50Ω		A28263	19-1576	TV-163	6210	

* Alternate part #A1202.
† Use trap winding only
♦ Use trap winding only and enlarge mounting hole.
■ Enlarge mounting hole.

FILTER CHOKE

ITEM No.	RATINGS			REPLACEMENT DATA					
	TOTAL DIRECT CURRENT	D. C. RESISTANCE	INDUCTANCE (0 CURRENT 1000 ∿)	FIRESTONE PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Halldorson PART No.	Thordarson PART No.
L33	.240ADC	62.5Ω	1.74 Hy.	PB-1406	C-2325 ①	C-2991 ①	C-23X ①	C5037 ①	26C44 ①

① Drill one new mounting hole.

FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA					
			FIRESTONE PART No.		LITTELFUSE PART No.		BUSS PART No.	
			FUSE	HOLDER	FUSE	HOLDER	FUSE	HOLDER
M1	3AG P/T S/B	6/10A 125V	A4955		315.600 (3AG P/T-6/10 S/B)		MDV 6/10	

MISCELLANEOUS

ITEM No.	PART NAME	FIRESTONE PART No.	NOTES
M2	Tuner	A541229	VHF
M3	Focus Magnet		Includes centering device
M4	Ion Trap		
B2	Trimmer Cap.	PA-1772	Horiz. Drive (25-280MMF)
	Cabinet	PE-60178-1	
	Knob	PC39281-1	Channel Selector
	Knob	PB39278	Fine tuning
	Knob	PC39280-1	Off/on Volume
	Knob	PB39279	Contrast
	Safety Glass	PC62488	

TROUBLE SHOOTING AIDS (cont)

PROPERTY OF
L. F. BLANKENSHIP
3024 MEADE ST.
DENVER, COLORADO

POWER

DEAD SET

If filaments fail to light, check AC interlock assembly, check switch on volume control, and T1. If filaments light, check M1. Substitute V20. Check B+ filter and decoupling network for component failure or change of value.

SMALL AND/OR DIM PICTURE

Substitute V20. Check B+ filter and decoupling network.

HIGH VOLTAGE

LOSS OF HIGH VOLTAGE

Check by substitution V16, V17, V18 and V19. Check waveform W18.

If Satisfactory	If Unsatisfactory
Check T3, T5A, T7, C92, C91, R96, R97 and other associated components.	Check C88, C86, C85, L32, R92, R90 and other associated components.

INSUFFICIENT HIGH VOLTAGE

Check by substitution V16, V17, V18 and V20. Check picture tube. Proceed as outlined under "Loss of High Voltage".

BLOOMING

Check by substitution V17, V18, V19 and V20. Check T3, T5A and other associated components.

GENERAL

RASTER, SOUND, NO PICTURE

Follow procedure outlined under "Loss of Video".

RASTER, PICTURE, NO SOUND

Follow procedure outlined under "Weak or No Sound".

RASTER, NO SOUND, NO PICTURE

Check by substitution V1, V2, V3, V4, V5, V6, V7, and V8. Check video IF components for failure or change of value.

NO RASTER, NO SOUND

Follow procedure outlined under "Dead Set".

KEYSTONE EFFECT

Check T5 and its associated components.

INTERMITTENT STREAKS

Check high voltage section for corona discharge and arcing.

Symptoms shown are assumed and are not indicative of the quality and workmanship of this equipment.

SERVICING IN THE FIELD

TUNER OSCILLATOR ADJUSTMENTS

Touch-up adjustments of VHF tuner oscillator circuit may be accomplished by removing the channel selector and fine tuning knobs.

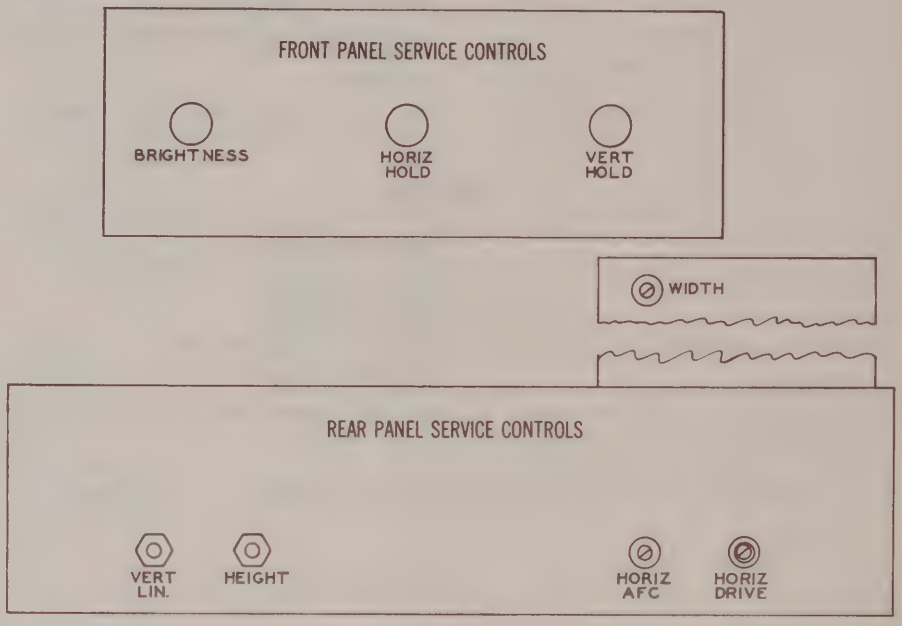
PICTURE TUBE SAFETY GLASS CLEANING

To clean safety glass, remove four (4) metal screws holding metal strip at the bottom of safety glass. Remove metal strip and safety glass. Use extreme caution when removing safety glass.

PICTURE TUBE REMOVAL

For picture tube removal it is necessary to remove chassis. (See disassembly instructions).

SERVICE ADJUSTMENT LOCATION



HORIZONTAL OSCILLATOR FIELD ADJUSTMENT

Adjustment of the horizontal oscillator circuit can be made from the rear panel of the chassis. Set the horizontal hold control at the mid-position of its range and adjust the horizontal oscillator slug (L32) until the picture synchronizes horizontally.

SOUND IF DETECTOR BUZZ ADJUSTMENT

To eliminate sound IF detector buzz, adjust the ratio detector secondary (L31) located on top of chassis. (See tube placement chart).

FUSES

One fuse is used for LV power supply protection. (For location see tube placement chart).

CENTERING

Centering is accomplished mechanically by means of a centering lever on the PM focusing assembly. Adjust the centering lever from side to side, and up and down until the picture is properly centered.

DISASSEMBLY INSTRUCTIONS

1. Remove 4 push-on type control knobs from front panel.
2. Remove 17 metal screws. Remove rear cover.
3. Disconnect speaker. Remove 2 speaker nuts. Remove speaker.
4. Remove 2 metal screws from antenna bracket. Remove bracket.
5. Remove 6 chassis bolts. Remove chassis.

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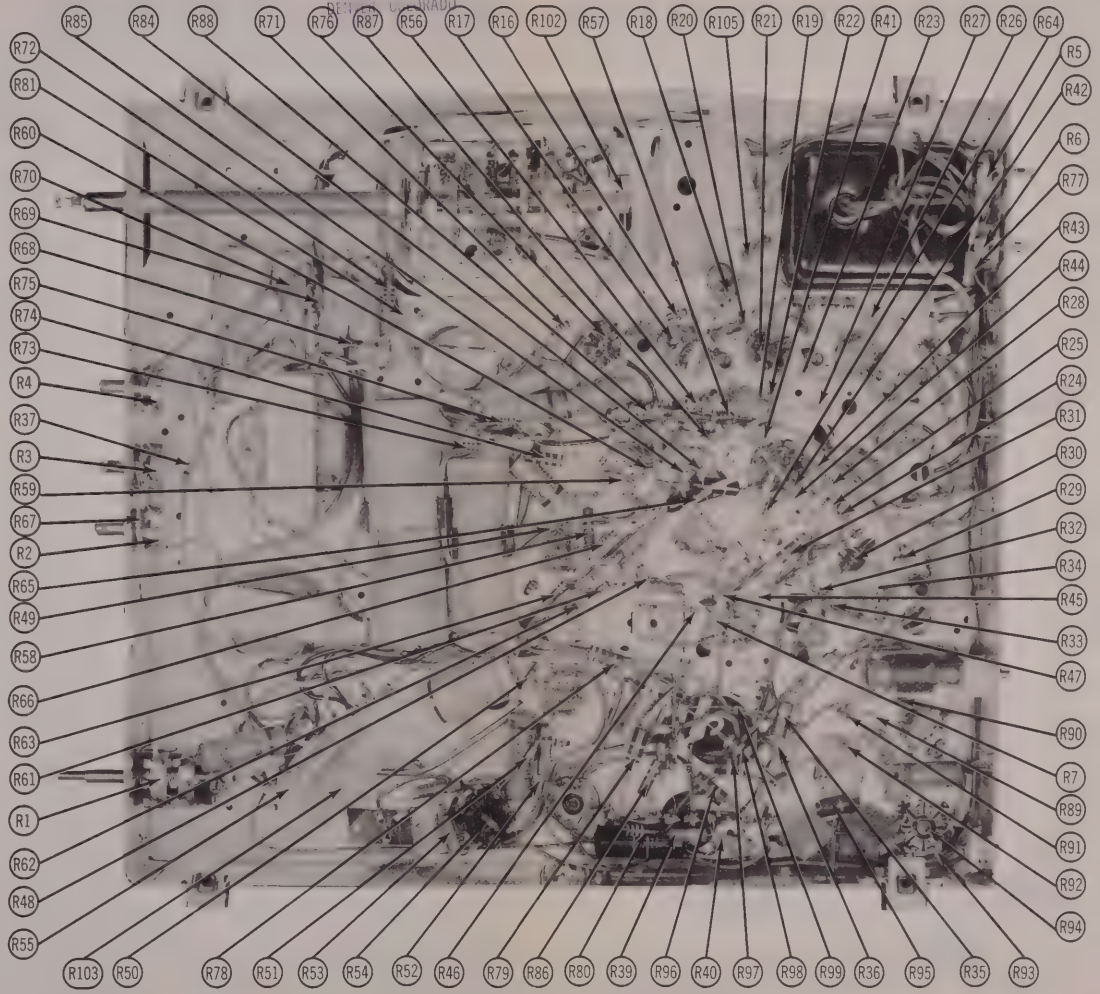

CHASSIS BOTTOM VIEW-RESISTOR IDENTIFICATION

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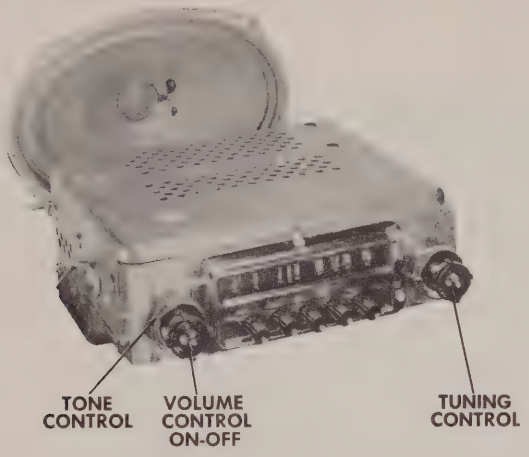

TRADE NAME	Ford Model 4MF (FDA-18805-B-2) (For 1954 Ford Automobiles)
MANUFACTURER	Motorola Inc., 4545 Augusta Blvd., Chicago 51, Ill.
TYPE SET	Battery Operated Custom Built Automobile Superhetrodyne Receiver
TUBES (Six)	Types 6BA6 RF Amp., 6BE6 Conv. 6BA6 IF Amp., 6AT6 Det. -AVC-AF Amp., 6AQ5 Audio Output, 6X4 Rectifier
POWER SUPPLY	6 Volt Storage Battery — RATING 4.1 Amp. @ 6.3 Volts DC
TUNING RANGE—BROADCAST	540-1600KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading.
Use an insulated alignment screwdriver for adjusting.
Turn tone control fully clockwise.
Set tuner at the low frequency end stop. Set the dial pointer 1/8" to the left of "55" on the dial with the dial pointer adjustment cam.
If it is necessary to adjust the tuning cores fabricate two aligning tools out of two strips of wood 4" long, ½ wide and 1/16"thick . Glue a 2" strip of rubber on one end of each wooden strip. Grasp the tuning core to be adjusted between rubber covered ends of the strips and rotate the core for maximum output as outlined in step 3.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.1MFD	High side to pin 7 (grid) of 6BE6 (V2). Low side to chassis.	265KC (400% Mod)	High frequency end stop	Across voice coil	A1, A2, A3, A4	Attenuate generator output to maintain 1.8 Volts on output meter. Adjust for maximum output.
2.	Fig. 1	Through dummy (Fig. 1) to antenna receptacle.	1608KC	"	"	A5, A6, A7	Adjust for maximum output
	NOTE: If tuning cores have been tampered with, and require alignment, ignore step 2 and continue alignment with step 3.						
3.	Fig. 1	Through dummy (Fig. 1) to antenna receptacle.	1200KC	1200KC	"	A8, A9, A10	Move tuner carriage 21/64" from high frequency end stop. Adjust in order given for maximum output.
4.	"	"	1608KC	High frequency end stop	"	A5, A6, A7	Adjust for maximum output. Repeat steps 3 and 4 until maximum output is obtained. Cement cores.
	The sensitivity control (R2) has been properly adjusted at the factory and should not require readjustment in the field.						
5.	Fig.1	Thru dummy (Fig.1) to antenna receptacle.	600KC (4 Microvolt output)	Tune for max. signal	Across voice coil	R2	Set sensitivity control for 1 watt output (1.79 volts on output meter).
6.	With the receiver installed in the car and the antenna fully extended tune in a weak station near 1400KC and adjust A7 for maximum volume.						

PUSH BUTTON ALIGNMENT

Unlock push button by turning one full turn counter clockwise. Tune manually to the desired station. Press the push button all the way in and lock the push button by turning it clockwise.
Follow the above procedure for the remaining pushbuttons.

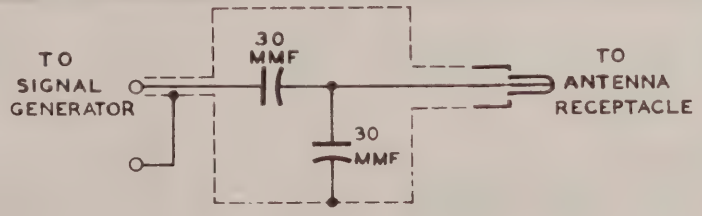

FIG. 1

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PARTS LIST AND DESCRIPTIONS

FORD
MODEL 4MF (FDA-18805-B-2)

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA		RETMA BASE TYPE	NOTES
		MOTOROLA PART No.	STANDARD REPLACEMENT		
V1	RF Amplifier	6BA6	6BA6	7BK	
V2	Converter	6BE6	6BE6	7CH	
V3	IF Amplifier	6BA6	6BA6	7BK	
V4	Det-AVC-AF Amp.	6AT6	6AT6	7BT	
V5	Audio Output	6AQ5	6AQ5	7BZ	
V6	Rectifier	6X4	6X4	5BS	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	MOTOROLA PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C1A	▲ 10	350	23A485677	AFH3-104		C077		FP328	TVL-3630	
B	■ 15	350								
C	20	25								
C2	.1	100	8R472035	P288-1	DF-104	PJ2P1		PT401	2TM-P1	
C3	120									
C4	27		21R114163	SI27NPO	TCZ-27	TZ16	NPOK-270			
C5	.05	400	8R14791	P488-05	DF-503	CUB4S5		PT415	4TM-S5	
C6	150		21R115089		TCN-150	TM26	N750K-151		5TCU-T15	
C7	.1	100	8R472035	P288-1	DF-104	PJ2P1		PT401	2TM-P1	
C8	4.7		21R115955	SI5	D6-050	TP06	GP1K-050	ZT-555	5GA-V5	
C9	.01	100	8R472754	P288-01	D6-103	PJ2S1	GP2-333-103	PT411	2TM-S1	
C10	.003	400	8R490437	P488-003	D6-302	CUB4D3	GP2L-302	PT423	4TM-D3	
C11	.02	100	8R51209	P288-02		CUB4S2		PT412	2TM-S2	
C12	.01	400	8R23690	P488-01	D6-103	CUB4S1	GP2-333-103	PT411	4TM-S1	
C13	330		21R2744	SI330	D6-331	G056	GP2K-331	UC-5333	5GA-T33	
C14	.004	400	8K71909	P488-004	D6-402	CUB4D4	GP2-333-402	PT424	4TM-D4	
C15	.5	100	8R170828	VHC-36		MP-2P5		RF480	2TM-P5	
C16	.03	1000	8K400883	P1088-03		CUB-1053		PT1013	MB-D3	

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	MOTOROLA PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	
R1A	1 Meg	½	18B530018				UF16L	Tone- Panel
B	250KΩ	½					UR-254-T753	Volume tapped @ 75K- Rear
C	Shaft						EB-214	Attach to R1B
D	Switch						US-27	Attach to R1B
R2	150Ω	1	18K512520		39-50			Sensitivity

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	MOTOROLA PART No.	IRC PART No.	
R3	470KΩ	½	6R6032	BTS-470K	
R4	10KΩ	1	6R6430	BTA-10K	
R5	220KΩ	½	6R6015	BTS-220K	
R6	47KΩ	½	6R6056	BTS-47K	
R7	2.2Meg	½	6R3927	BTS-2.2Meg	
R8	22KΩ	2	6R2098	BTB-22K	
R9	1 Meg	½	6R6004	BTS-1 Meg	
R10	2.2 Meg	½	6R3927	BTS-2.2Meg	
R11	47KΩ	½	6R6056	BTS-47K	
R12	12KΩ	½	6R6394	BTS-12K	

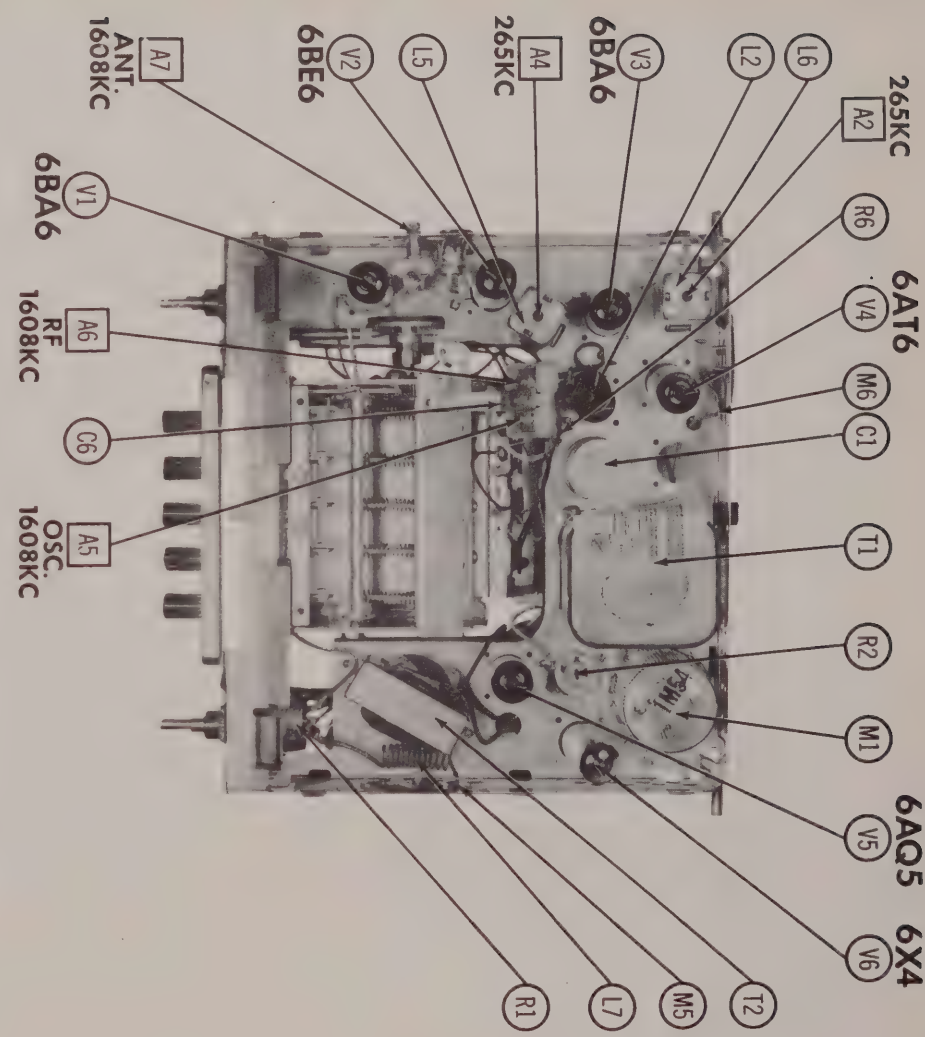
ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	MOTOROLA PART No.	IRC PART No.	
R13	4.7Meg	½	6R6446	BTS-4.7Meg	
R14	39Ω	½	6R2085	BTS-39	
R15	1 Meg	½	6R6004	BTS-1 Meg	
R16	220KΩ	½	6R6015	BTS-220K	
R17	220Ω	1	6R6389	BTA-220	
R18	2200Ω	2	6R476130	BTB-2200	
R19	.47Ω	½	17K488266		
R20	56Ω	½	6R5614	BTS-56	
R21	56Ω	½	6R5614	BTS-56	

TRANSFORMER (VIBRATOR)

ITEM No.	RATING				REPLACEMENT DATA					
	PRI.	SEC. 1	SEC. 2	SEC. 3	MOTOROLA PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Halldorson PART No.	Thordarson PART No.
T1	6.3VCT @ 2.7A	420VCT .038ADC			25C521454 25C511653 ①	P-6301 ②		V-1K		22R29 ②

① Alternate Power transformer.
② Drill new mounting holes.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	MOTOROLA PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Halldorson PART No.	Thordarson PART No.	
T2	4.8KΩ	3.5Ω	25B530761	A-3323	A-3019	S-5Z	Z1002	26S49	

SPEAKER

ITEM No.	RATINGS			REPLACEMENT DATA			NOTES
	SIZE	FIELD	V. C. IMP.	MOTOROLA PART No.	JENSEN PART No.	QUAM PART No.	
SP1	6" x 9"	PM	3.5Ω	50D530699	ST-810 Mod. P69-V	69A2	

COILS (RF-IF)

ITEM No.	USE	DC RES.		REPLACEMENT DATA				NOTES
		PRI.	SEC.	MOTOROLA PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L1	Ant. Coil	10Ω		24B510175				Part of tuner unit
L2	IF Trap			24K512088				
L3	RF Coil	13Ω		24K510176				Part of tuner unit
L4	Osc. Coil	1.3Ω	3.4Ω	24B510112				Part of tuner unit
L5	Input IF	37Ω	35Ω	24B580193 *	16-6752	BC-350	12-H1	
L6	Output IF	38Ω	38Ω	24K591267 †	16-6754	BC-354	12-H6	
L7	Line Choke	0Ω						
L8	Fil. Choke	.2Ω		24A531057				123 Microhenries
L9	Vibrator Hash Choke	0Ω		24A472535		BC-537	5221	15 Microhenries

* Alternate Part # 24K512407.
† Alternate Part # 24K512408.

VIBRATOR

ITEM No.	TYPE	INPUT VOLTS	FREQUENCY	REPLACEMENT DATA				NOTES
				MOTOROLA PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	RADIART PART No.	
M1	Interrupter	6.3V	115∿	48B3333	5342	859	5342	

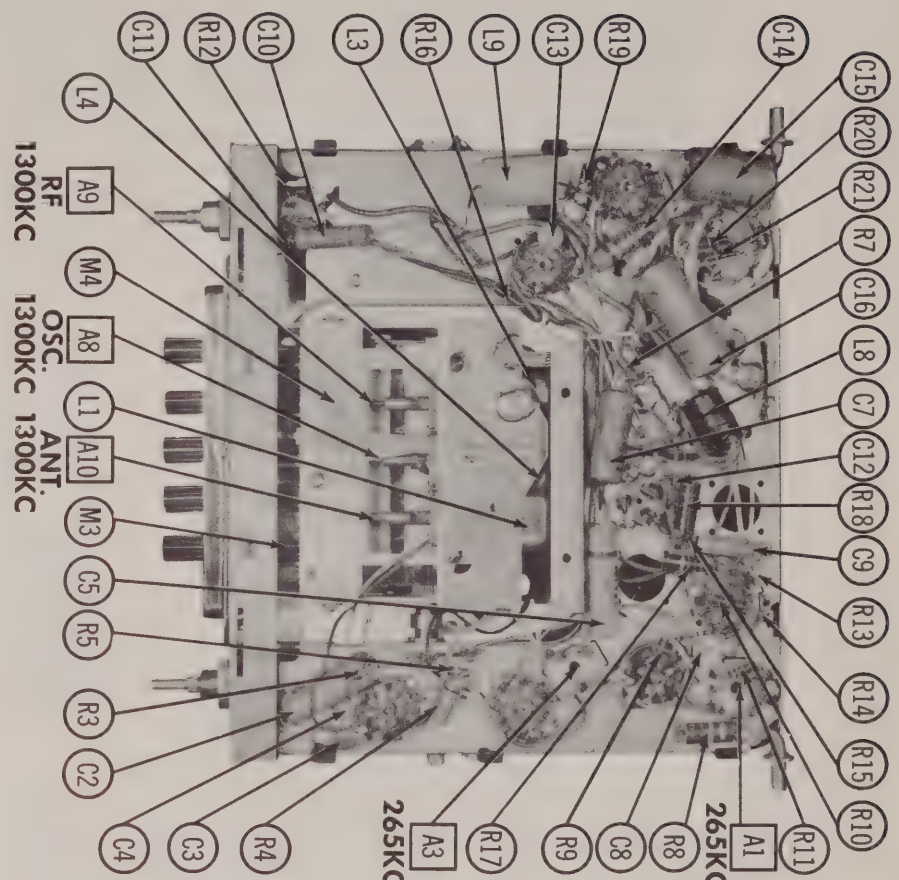
FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA					
			MOTOROLA PART No.		LITTELFUSE PART No.		BUSS PART No.	
			FUSE	HOLDER	FUSE	HOLDER	FUSE	HOLDER
M2	SFE	9A	65K16248	9K530638	307009 (SFE-9A)	155009	SFE9	HRH

MISCELLANEOUS

ITEM No.	PART NAME	MOTOROLA PART No.	NOTES
M3	Dial light	65X12855	# 55 bayonet
M4	Tuner	77K530219	Complete
M5	Spark Plate	64K530177	"A" lead and speaker (2 used)
M6	Spark Plate	64A530176	Dial light
A7	Trimmer cap	20B530768	Antenna
	Trimmer strip	20K531050	5 in 1 (47MMF, 47MMF, 200MMF fixed) (7.5 - 90MMF variable) (480-560MMF variable)
	Clutch drive	51A500995	Assembly
	Push button	51B511531	and screw assembly
	Knob	36B511437	Tone and dummy
	Knob	36A530011	Volume and tuning
	Dial glass	61B522390	

CHASSIS—BOTTOM VIEW



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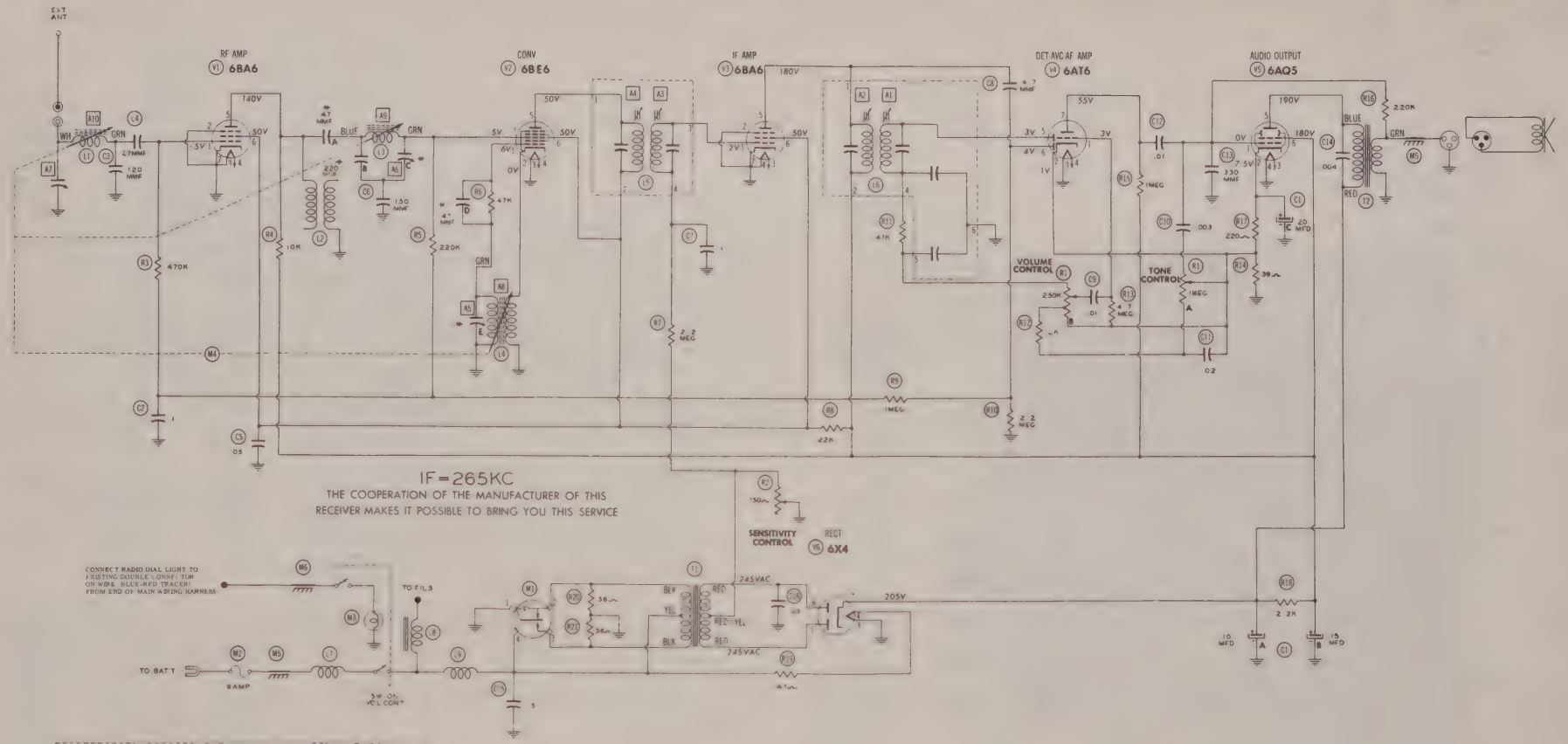
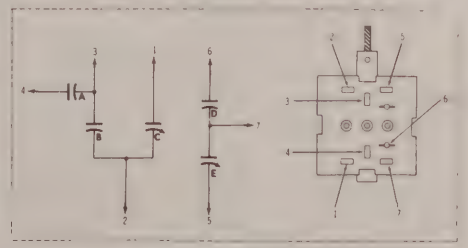
FORD
MODEL 4MF (FDA-18805-B-2)





* THESE CAPACITORS ARE COMBINED IN ONE UNIT.
PART #20B53060.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V 1	6BA6	3. 7Meg	0Ω	0Ω	1Ω	† 12. 2KΩ	† 24KΩ	0Ω
V 2	6BE6	47KΩ	1. 3Ω	0Ω	1Ω	† 24KΩ	† 24KΩ	3. 4Meg
V 3	6BA6	2. 2Meg	0Ω	1Ω	0Ω	† 2. 2KΩ	† 24KΩ	0Ω
V 4	6AT6	4. 7Meg	39Ω	0Ω	1Ω	300KΩ	2. 2Meg	† 1 Meg
V 5	6AQ5	220K	260Ω	1Ω	0Ω	† 590Ω	† 2. 2KΩ	220KΩ
V 6	6X4	430Ω	1Ω	0Ω	1Ω	INF	460Ω	150KΩ

† MEASURED FROM PIN 7 OF V6.

1. DC voltage measurements taken with vacuum tube voltmeter, AC voltages measured at 1000 ohms per volt
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Battery voltage maintained at 6.3 volts for voltage readings.
5. Nominal tolerance on components values makes possible a variation of ± 15% in voltage and resistance readings
6. Volume control at maximum, no signal applied for voltage measurements.

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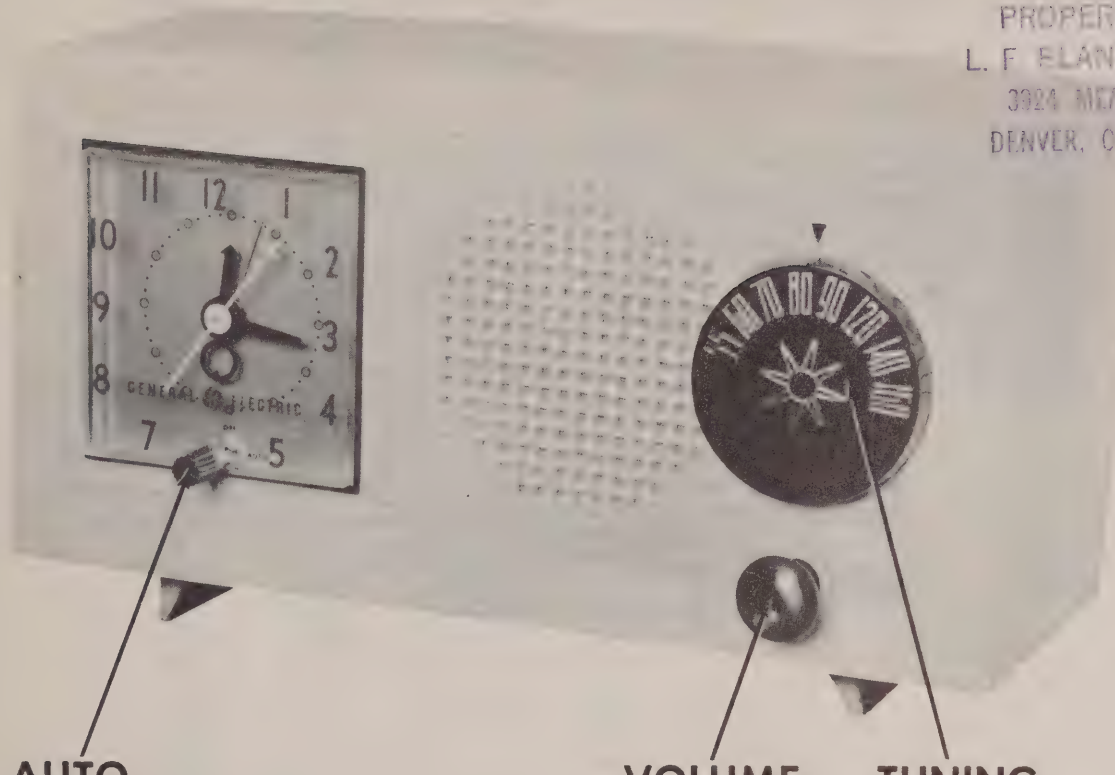

GENERAL ELECTRIC
MODELS 555, G, 556

TRADE NAME	General Electric Models 555, G, 556
MANUFACTURER	General Electric Co., Electronics Dept., Electronics Park, Syracuse, N.Y.
TYPE SET	AC Operated AM Superheterodyne Receiver With Electric Clock
TUBES (Four)	Types 12AU6 Conv., 12AV6 Det.-AF Amp., 50C5 Audio Output, 35W4 Rectifier
POWER SUPPLY	110-120 Volts AC-60 Cycles — RATING .21 Amp. @ 117 Volts AC
TUNING RANGE—BROADCAST	540-1600KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

With tuning gang fully closed set left edge of "55" on dial to the index mark on cabinet.
Use isolation transformer, if available. If not, connect a .1MFD capacitor in series with low side of signal generator and B-.
Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.
Loop should be maintained in same relative position to chassis as when receiver is in cabinet.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.05MFD	High side to antenna stator lug on tuning gang. Low side to B-.	455KC (400∿Mod)	Tuning gang fully open	Across voice coil	A1, A2	Adjust for maximum output. If isolation transformer is not used, reduce dummy antenna to .001MFD to reduce hum modulation.
2.		Loop	1620KC	"	"	A3	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
3.		"	1500KC	Tune to 1500KC signal	"	A4	Adjust for maximum output while rocking tuning gang thru 1500KC signal.

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PARTS LIST AND DESCRIPTIONS

GENERAL ELECTRIC MODEL 555

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA: General Electric PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RETMA BASE TYPE	NOTES
V1	Converter	12AU6	12AU6	7BK	
V2	Det.-AF Amplifier	12AV6	12AV6	7BT	
V3	Audio Output	50C5	50C5	7CV	
V4	Rectifier	35W4	35W4	5BQ	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: General Electric PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C1A	40	150	RCE-158	PRS150/40-20		BBRD4215		2N514	TVA-2438	Red Note 1.
B	20	150				BR550		TC30	TVA-1203	Blue
C	5	25		PRS150/4						Green
C2	47		RCW-3075	SI47	D6-470	TP29	GP1K-290	UC-5427	5GA-Q47	
C3	33	500	UCU-1016			22R5Q33				
C4	27	500	UCU-1014			22R5Q27				
C5A	50		RCW-3091	PA-100-2	D6-500	TP30	GP1K-500	UC-545	5GA-Q5	
B	2000				DD-202	K072	801-002	DC-522	5HK-D2	
C	220				D6-221	TP39	GP2K-221	UC-5322	5GA-T22	
D	5000				DD-502	K082	801-005	DC-525	5HK-D5	
C6	.01	400	UCC-040	P488-01	D6-103	CUB4S1	GP2-333-103	PT411	4TM-S1	
C7	.05	400	UCC-045	489ZX-05	DF-503	CUB4S5		PT415	4TM-S5	
C8	.05	400	UCC-045	489ZX-05	DF-503	CUB4S5		PT415	4TM-S5	

Note 1. Sets using audio output transformer, part #RTO-137, use a 100-20MFD @ 150V in this application (Part # RCE-193).

CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: General Electric PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	2.2Meg	1/2	RRC-238	Q13-139	A47-2Meg-Z	AB-76	U-55	Volume
B	Shaft		Not Req.	Not Req.	KSS-3	AK-4	Not Req.	Attach to R1A

RESISTORS

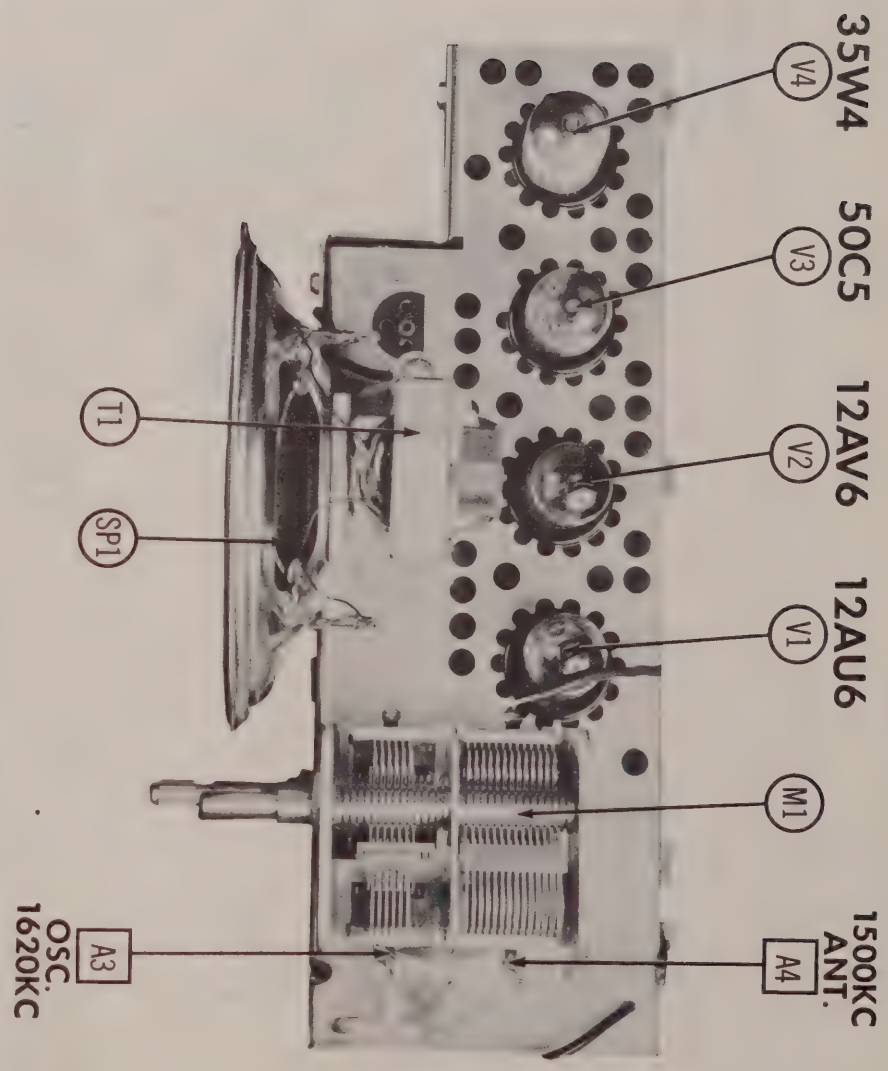
ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: General Electric PART No.	IRC PART No.	NOTES
R2	2.2Meg	1/2	URD-129	BTS-2.2Meg	
R3	6.8Meg	1/2	URD-141	BTS-6.8Meg	
R4	470KΩ	1/2	URD-113	BTS-470K	
R5	470KΩ	1/2	URD-113	BTS-470K	

ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: General Electric PART No.	IRC PART No.	NOTES
R6	180Ω	1/2	URD-031	BTS-180	
R7	6800Ω	1/2	URD-069	BTS-6800	
R8	33Ω	2	URF-013		

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE: PRI.	IMPEDANCE: SEC.	REPLACEMENT DATA: General Electric PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Halldorson PART No.	Thordarson PART No.	NOTES
T1	2.4KΩ tapped	3.1Ω	RTO-144 RTO-137 ②	A-3336 ①	A-3031 ①		Z1102 ①	TS-24S50A ①	① Drill one new mounting hole. ② Used in late production, primary not tapped.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

SPEAKER

ITEM No.	RATINGS			REPLACEMENT DATA			NOTES
	SIZE	FIELD	V. C. IMP.	General Electric PART No.	JENSEN PART No.	QUAM PART No.	
SP1	4"	PM	3.1Ω	ROP-025	ST-113 Mod. P4-X ①	4A1	① Use universal mounting brackets.

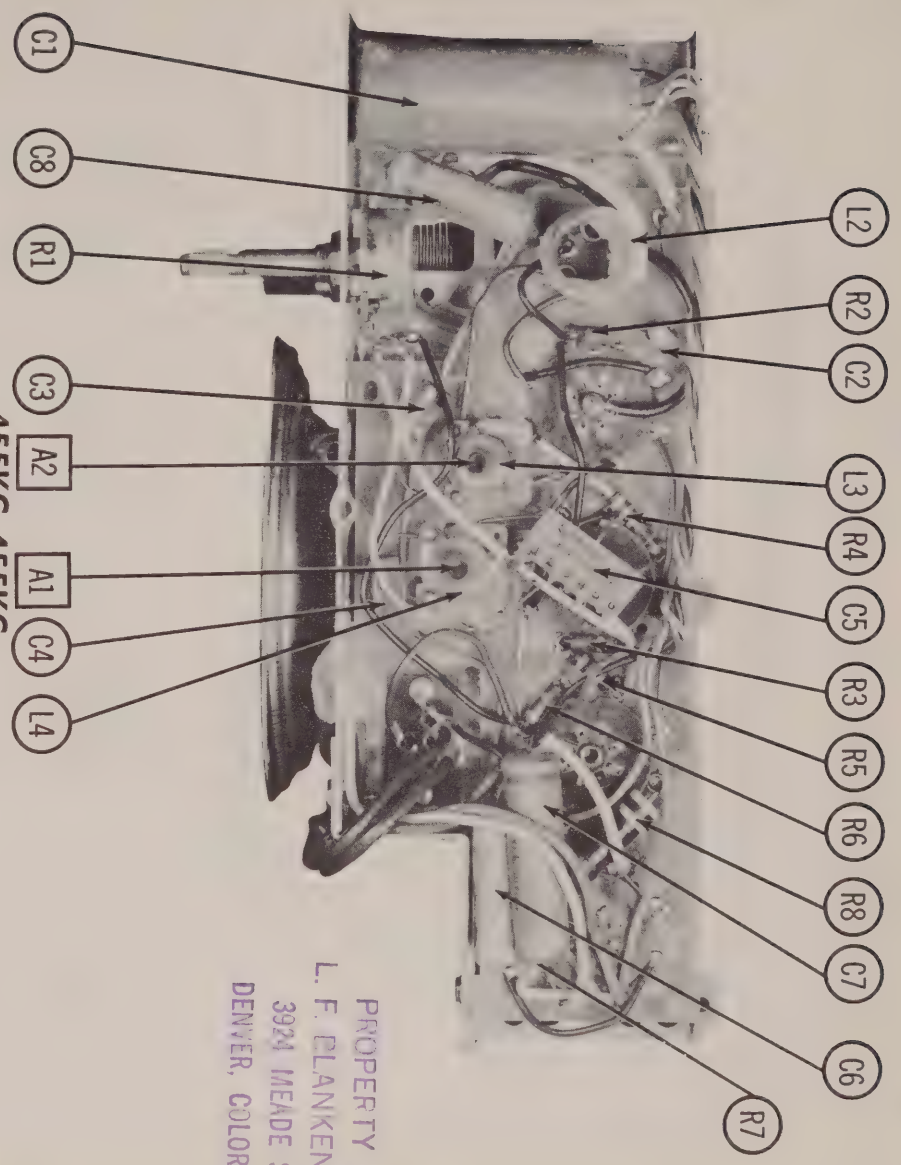
COILS (RF-IF)

ITEM No.	USE	DC RES.		REPLACEMENT DATA				NOTES
		PRI.	SEC.	General Electric PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L1	Loop Ant.	3.1Ω		RAB-224				Includes cabinet back
L2	Osc. Coil	1.1Ω	7.5Ω	RLC-128				Pickup winding -1.9Ω
L3	IF Trans. Primary	30Ω		RTL-150				Tapped @ .8Ω
L4	IF Trans. Secondary	33Ω		RTL-149				

MISCELLANEOUS

ITEM No.	PART NAME	General Electric PART No.	NOTES
M1	Tuning Cap.	RCT-068	(28-432MMF, 13-120MMF)
M2A	Clock	RZC-027	Early model 555
B	Clock	RZC-028	Late model 555 and all 556 models (clocks are interchangeable in these receivers)
	Cabinet	RAU-388	Ivory - Model 555
	Cabinet	RAU-417	Grey - Model 555G
	Cabinet	RAU-402	Red - Model 556
	Knob	RDK-295	Ivory - volume - model 556
	Knob	RDK-356	Dk brown - tuning with dial scale - model 555
	Knob	RDK-357	Dk brown - volume with brass insert - model 555
	Knob	RDK-389	Ivory - tuning with dial scale - model 556
	Knob	RZK-016	Brown - clock RZC-027
	Knob	RZK-021	Brown - clock RZC-028
	Knob	RZK-025	Ivory - clock RZC-028
	Crystal	RZW-009	Clock - model 555
	Crystal	RZW-011	Clock - model 556
	Board	RII-089	Sub-chassis, bare (no hardware or parts)

CHASSIS—BOTTOM VIEW



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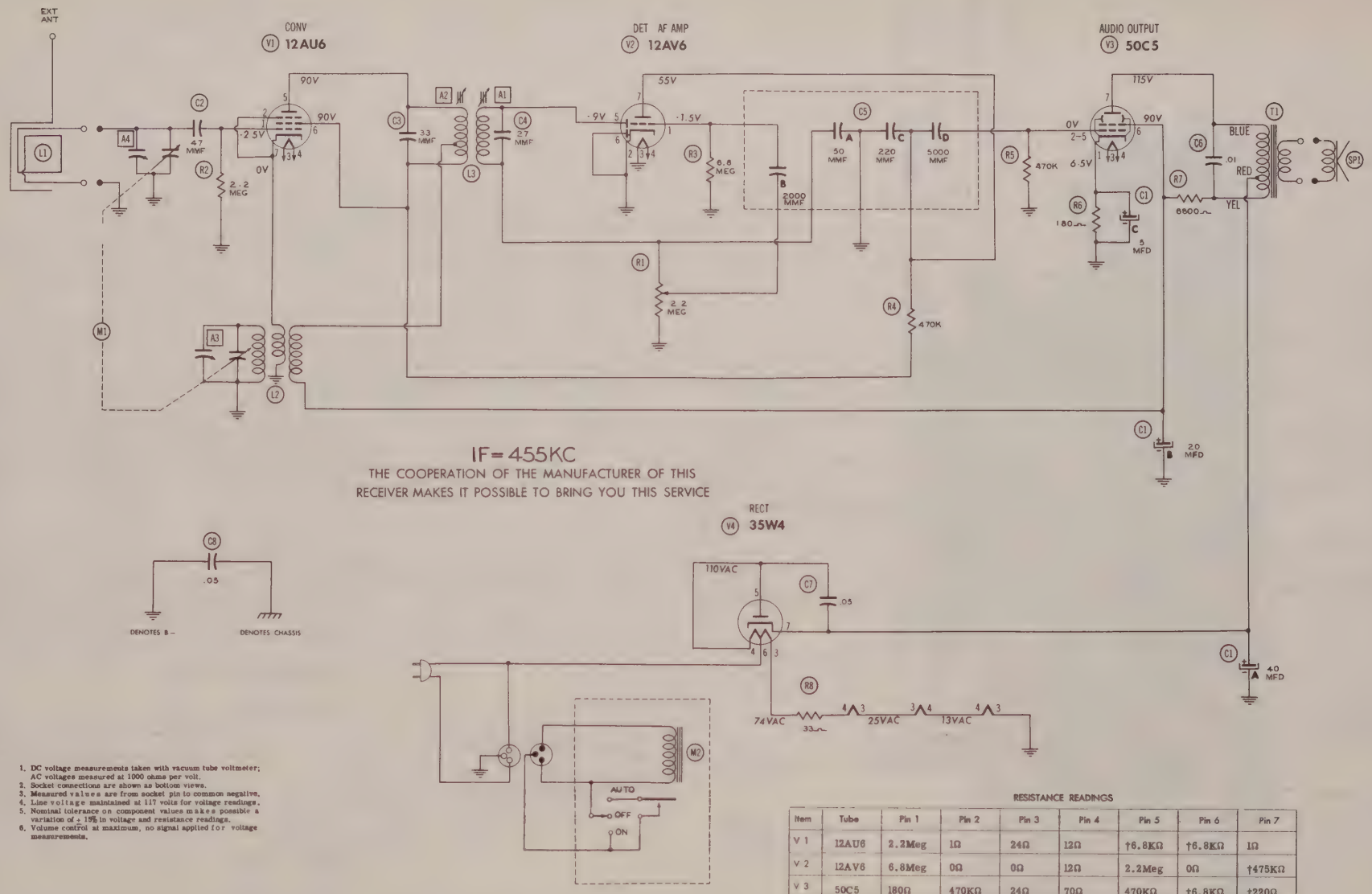
GENERAL ELECTRIC
MODEL 555



IF = 455KC

THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V 1	12AU6	2.2Meg	1Ω	24Ω	12Ω	†6.8KΩ	†6.8KΩ	1Ω
V 2	12AV6	6.8Meg	0Ω	0Ω	12Ω	2.2Meg	0Ω	†475KΩ
V 3	50C5	180Ω	470KΩ	24Ω	70Ω	470KΩ	†6.8KΩ	†220Ω
V 4	35W4	INF	INF	110Ω	145Ω	145Ω	137Ω	300KΩ

† MEASURED FROM PIN 7 OF V4

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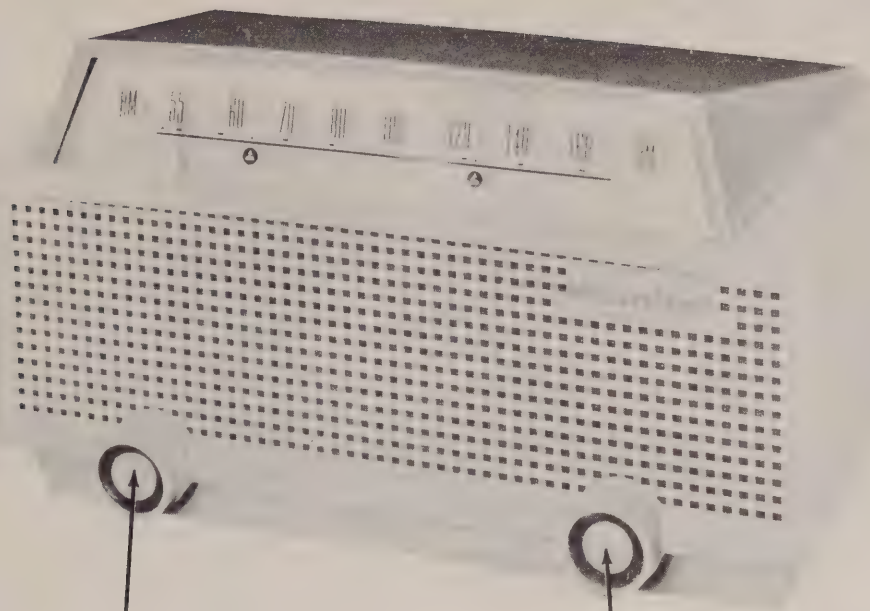
HALLICRAFTERS
MODELS 611, 612



VOLUME CONTROL ON-OFF SWITCH

TUNING CONTROL

HALLICRAFTERS
MODELS 611, 612

TRADE NAME	Hallicrafters Models 611, 612
MANUFACTURER	Hallicrafters Co., 4401 W. 5th Ave., Chicago 24, Ill.
TYPE SET	AC-DC Operated AM Superheterodyne Receiver
TUBES (Six)	Types 12BA6 RF Amp., 12BE6 Conv., 12BA6 IF Amp., 12AV6 Det-AVC-AF Amp., 35C5 Audio Output, 35W4 Rectifier
POWER SUPPLY	105-125 Volts AC-DC
RATING	.25 Amp. @ 117 Volts AC
TUNING RANGE—BROADCAST	535-1620KC
SHORT WAVE	

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Use isolation transformer, if available. If not, connect a .1MFD capacitor in series with low side of signal generator and B-. Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting .

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.01MFD	High side to pin 7 (grid) of 12BE6 (V2). Low side to B-.	455KC (400∿ Mod.)	Tuning gang fully open	Across voice coil	A1, A2, A3, A4	Adjust for maximum output. If isolation transformer is not used, reduce dummy antenna to .001MFD to reduce hum modulation.
2.	"	"	1620KC	"	"	A5	"
3.	"	High side to pin 1 (grid) of 12BA6 (V1). Low side to B-.	1400KC	Tune to 1400KC signal	"	A6	"
4.		Loop	1400KC	"	"	A7	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
5.		"	600KC	Tune to 600KC signal	"	A8, A9	Adjust for maximum outputs. Repeat step 4.

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PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA: Hallicrafters PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RETMA BASE TYPE	NOTES
V1	RF Amplifier	12BA6	12BA6	7BK	
V1	Converter	12BE6	12BE6	7CH	
V3	IF Amplifier	12BA6	12BA6	7BK	
V4	Det-AVC-AF Amp.	12AV6	12AV6	7BT	
V5	Output	35C5	35C5	7CV	
V6	Rectifier	35W4	35W4	5BQ	V5 & V6 are interchanged physically on some models.

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: Hallicrafter PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C1A	▲ 50	150	45A244	AFH3-44		C035		FC410	TVL-3728	
B	■ 50	150								
C	▲ 50	150								
C2	.047	200	46BS473L2	P288-047	DF-503	PJ2S47		PT4147	2TM-S47	
C3	220		47CA20A221K	SI220	D6-221	TP39	GP1K-221	UC-5322	5GA-T22	
C4	.047	200	46BS473L2	P288-047	DF-503	PJ2S47		PT4147	2TM-S47	
C5	220		47CA20A221K	SI220	D6-221	TP39	GP1K-221	UC-5322	5GA-T22	
C6	47		47CA20A470K	SI47	D6-470	TP29	GP1K-470	UC-5447	5GA-Q47	
C7	20000		47A242	BPD-02	DD-203	K084		DC-512	5HK-S2	
C8	.1	200	46BS104L2	P288-1	DF-104	PJ2P1		PT401	2TM-P1	
C9	20000		47A242	BPD-02	DD-203	K084		DC-512	5HK-S2	
C10A	100		♦ PC-50	♦ PA-97	♦PC-50	♦111TM1	♦ 1403-01	UC-531	♦ D-1	
B	100							UC-531		
C11	10000		47A224	BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C12A	10000									
B	250		* PC-80	* PA-112-3	*-PC-80	* 113TM1	* 1404-01		* T-1	
C										
C13	.0047	400	46BS472L4	P488-0047	D6-472	CUB4D47	GP2-333-472	PT4247	4TM-D47	
C14	.047	200	46BS473L2	P288-047	DF-503	PJ2S47		PT4147	2TM-S47	
C15	.047	400	46BR473L4	P488-047	DF-503	CUB4S47		PT4147	4TM-S47	
C16	.1	600	46BS104L6	P688-1	DF-104	CUB6P1		PT601	6TM-P1	
C17	5000		47A442	BPD-005	DD-502	K080	801-005	DC-525	5HK-D5	

♦ Items C10A, C10B and R13 are combined in one unit.
* Items C12A, C12B, C12C, R15A and R15B are combined in one unit. When replacing item separately, items C12B and C12C should total 250MMF.

CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: Hallicrafters PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	500KΩ	½	25B1065	Q19-133X	A47F2-500K		UT-431	Volume- tapped @ 260KΩ
B	Shaft		Not Req.	Not Req.	FS-3		Not Req.	Attach to R1A
C	Switch		Not Req.	76-1	SWE-12		US-26	Attach to R1A

RESISTORS

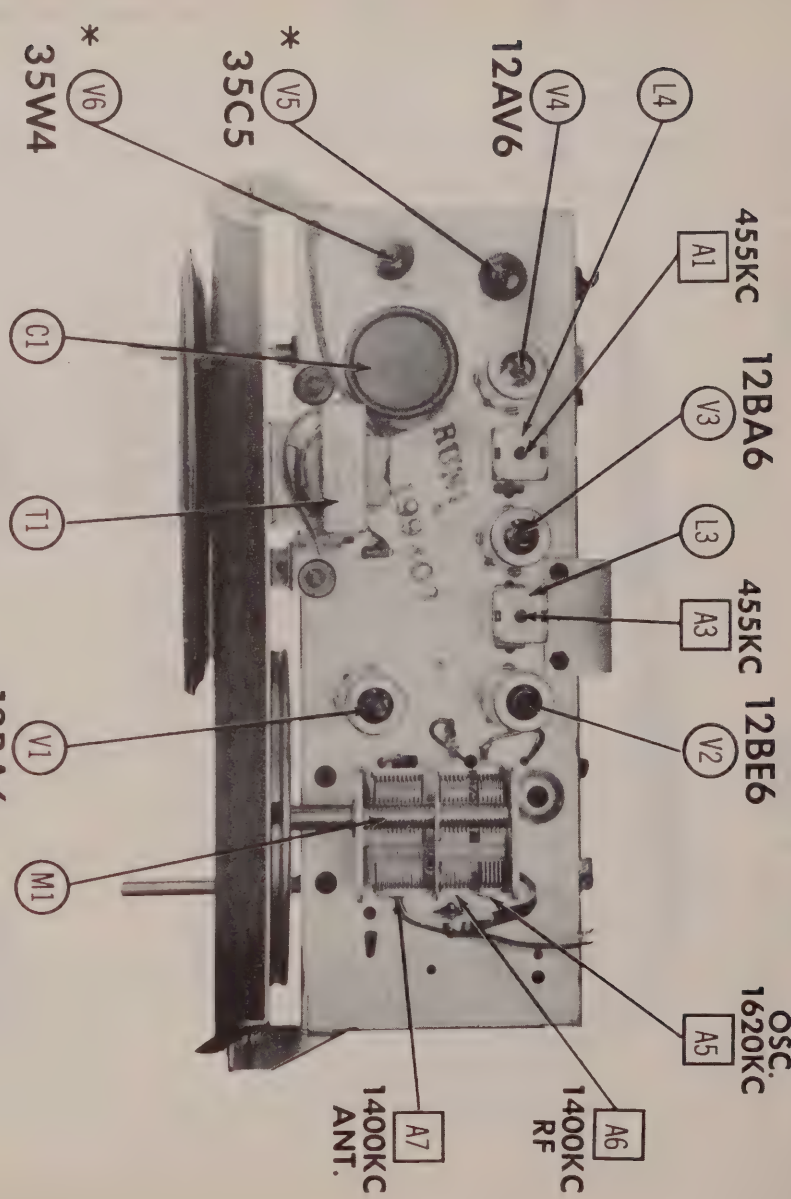
ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: Hallicrafter PART No.	IRC PART No.	NOTES
R2	1 Meg	½	23X20X105K	BTS-1 Meg	
R3	33Ω	2	23X20X330K	BTS-33	
R4	1200Ω	½	23X20X122K	BTS-1200	
R5	5600Ω	½	23X20X562K	BTS-5600	
R6	1 Meg	½	23X20X105K	BTS-1 Meg	
R7	22KΩ	½	23X20X223K	BTS-22K	
R8	1200Ω	½	23X20X122K	BTS-1200	
R9	4. 7Meg	½	23X20X475K	BTS-4. 7Meg	
R10	2. 7Meg	½	23X20X275K	BTS-2. 2Meg	
R11	33KΩ	½	23X20X333K	BTS-33K	

ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: Hallicrafters PART No.	IRC PART No.	NOTES
R12	1200Ω	½	23X20X122K	BTS-1200	
R13	47KΩ	½	♦ PC-50	BTS-47K	
R14	2. 7Meg	½	23X20X275K	BTS-2. 7Meg	
R15A	470KΩ	½	* PC-80	BTS-470K	
B	470KΩ	½		BTS-470K	
R16	150Ω	½	23X20X151K	BTS-150	
R17	120Ω	2	23X40X121K		
R18	390Ω	1	23X30X391K	BTA-390	
R19	150KΩ	½	23X20X154K	BTS-150K	

♦ Items R13, C10A, C10B are combined in one unit.
* Items R15A, R15B, C12B, C12C are combined in one unit.

* V5 & V6 ARE PHYSICALLY INTERCHANGED ON SOME MODELS

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	Hallicrafter PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Halldorson PART No.	Thordarson PART No.	
T1	2.4KΩ	3.2Ω	Part of speaker	A-3876 ①	A-2928 ①	S-1X ①	Z1001 ①	24S50 ①	① Bend mounting tabs down. File out slots. Mount on original mounting bracket.

SPEAKER

ITEM No.	RATINGS			REPLACEMENT DATA			NOTES
	SIZE	FIELD	V. C. IMP.	Hallicrafter PART No.	VIKING PART No.	QUAM PART No.	
SP1	4" x 6"	PM	3.2Ω	85C148	46J6	46A1	Cut corner same as original speaker.

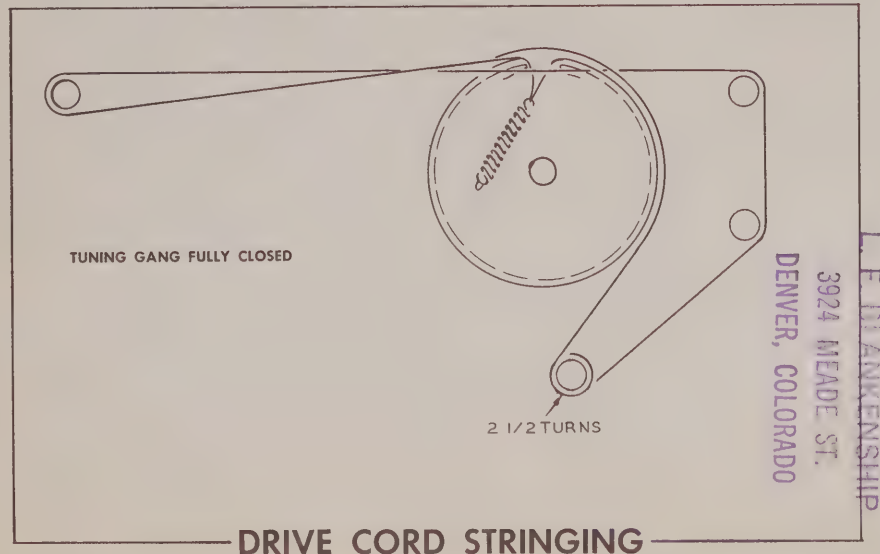
COILS (RF-IF)

ITEM No.	USE	DC RES.		REPLACEMENT DATA				NOTES
		PRI.	SEC.	Hallicrafters PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L1	Loop Ant.	2.3Ω		57C200				Includes cabinet back
L2A	RF Coil	2.6Ω	5.5Ω	♦ 51B1784	14-1072		A-5495-RF†	
B	Osc. Coil	.7Ω	9Ω		14-1028	BC-381	71-Osc.	
L3	Input IF	17Ω	17Ω	500248	16-6758	BC-352	12-C1	
L4	Output IF	17Ω	17Ω	50C248	16-6758	BC-353	12-C2	

♦ Replace as one unit.
† Enlarge mounting hole.

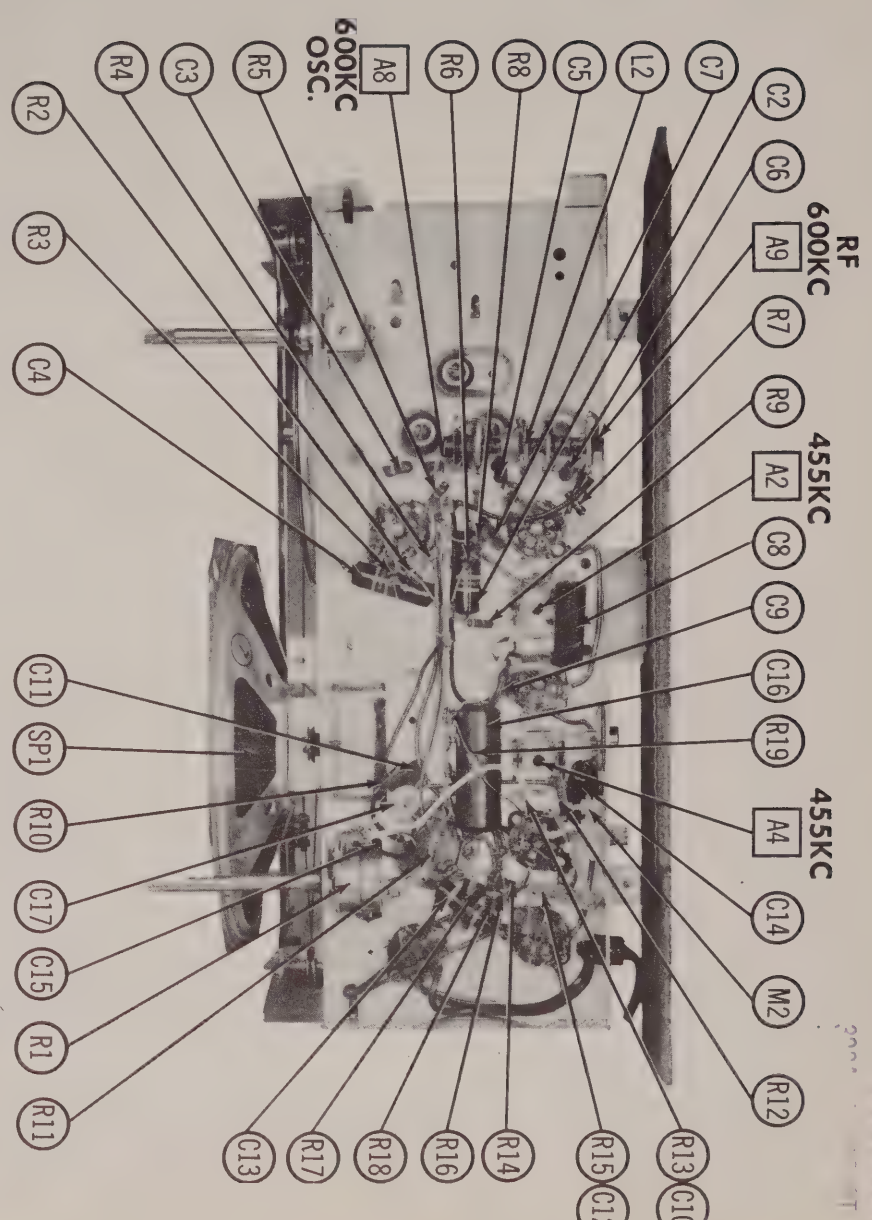
MISCELLANEOUS

ITEM No.	PART NAME	Hallicrafters PART No.	NOTES
M1	Tuning cap	48B319	14-350MMF, 12-210MMF, 10-100MMF)
M2	Switch	60A381	Radio-phono
	Cabinet	116F025	Brown- Model 611
	Cabinet	116A044	Green- Model 612
	Knob	15A662	Beige, Model 611
	Knob	15A701	Green, Model 612
	Dial scale	83C463	Green, Model 612



DRIVE CORD STRINGING

CHASSIS—BOTTOM VIEW



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HALLICRAFTERS
MODEL 611

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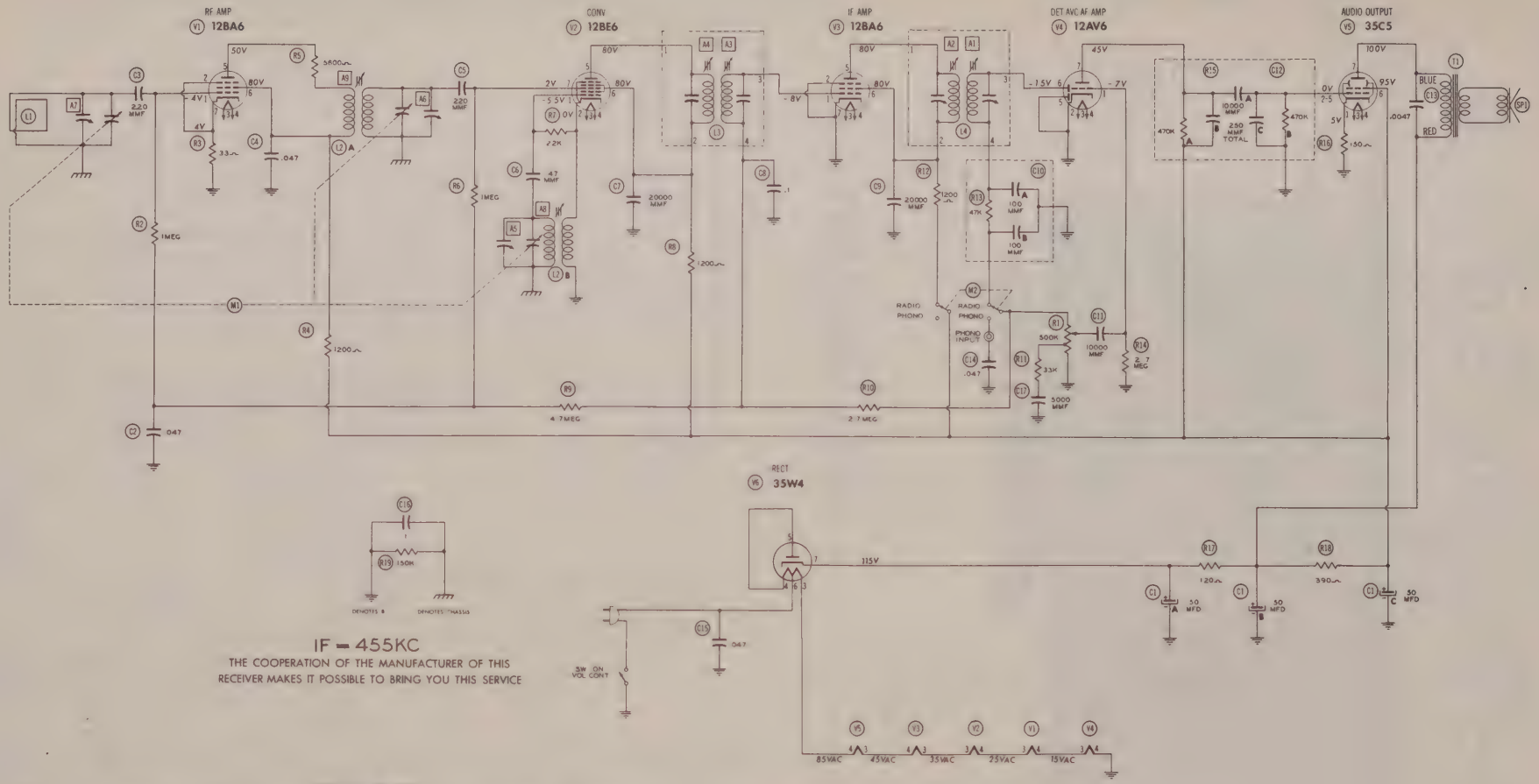

IF = 455KC

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RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V 1	12BA6	9 Meg	33Ω	25Ω	13Ω	† 7. 3KΩ	† 1. 7KΩ	33Ω
V 2	12BE6	22KΩ	. 8Ω	37Ω	25Ω	† 1. 7KΩ	† 1. 7KΩ	9 Meg
V 3	12BA6	3. 2Meg	0Ω	37Ω	50Ω	† 1. 7KΩ	† 1. 7KΩ	0Ω
V 4	12AV6	2. 7Meg	0Ω	13Ω	0Ω	0Ω	550KΩ	† 470KΩ
V 5	35C5	150Ω	470KΩ	50Ω	85Ω	470KΩ	† 510Ω	† 310Ω
V 6	35W4	0Ω	INF	85Ω	122Ω	122Ω	115Ω	300KΩ

† MEASURED FROM PIN 7 OF V6.

1. DC voltage measurements taken with vacuum tube voltmeter
AC voltages measured at 1000 ohms per volt.
2. Scale ... are shown as bold in screw.
3. Measured values are from socket pin to chassis negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Normal tolerance of components causes readings possible ±
variation of ... in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

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MODEL 21M160

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DATE 9-54 SET 250 FOLDER 13

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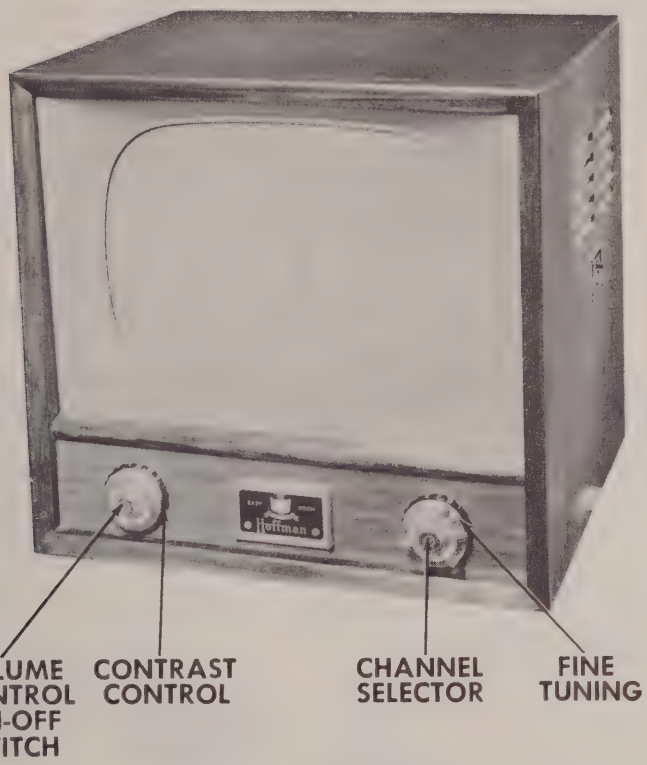

HOFFMAN MODEL 21M160

TRADE NAME	Hoffman	MODELS	CHASSIS
		21B331, 21M330, 21P332	405-21
		21B161, 21B334, 21M160, 21M333	406-21
MANUFACTURER	Hoffman Radio Corp., 6200 S. Avalon Blvd., Los Angeles 3, Calif.		
TYPE SET	Television Receiver		
TUBES	Twenty-one		
POWER SUPPLY	110-120 Volts AC-60 Cycles	RATING 1.56 Amp. @ 117 Volts AC	
TUNING RANGE	Channels 2 thru 13 VHF, 14 thru 83 UHF, Video IF 45.75MC, Sound IF 41.25MC (Intercarrier)		

INDEX

Alignment Instructions 6, 7
Disassembly Instructions 18
Horizontal Sweep Circuit Adjustments 11
Parts List and Descriptions 14, 15, 16
Photographs
Cabinet-Rear View 11
Capacitor Identification 4, 9
Chassis-Top View 3
RF Tuner 10
Resistor Identification 19, 20
Photographs (Cont)
Trans., Inductor & Alignment Identification 17
Resistance Measurements 8
Servicing in the Field 18
Schematic (Alternate Tuner) 13
Schematic (TV) 2
Trouble Shooting Aids 12, 17
Tube Failure Check Chart 5
Tube Placement Chart (Bottom View) 8
Tube Placement Chart (Top View) 5

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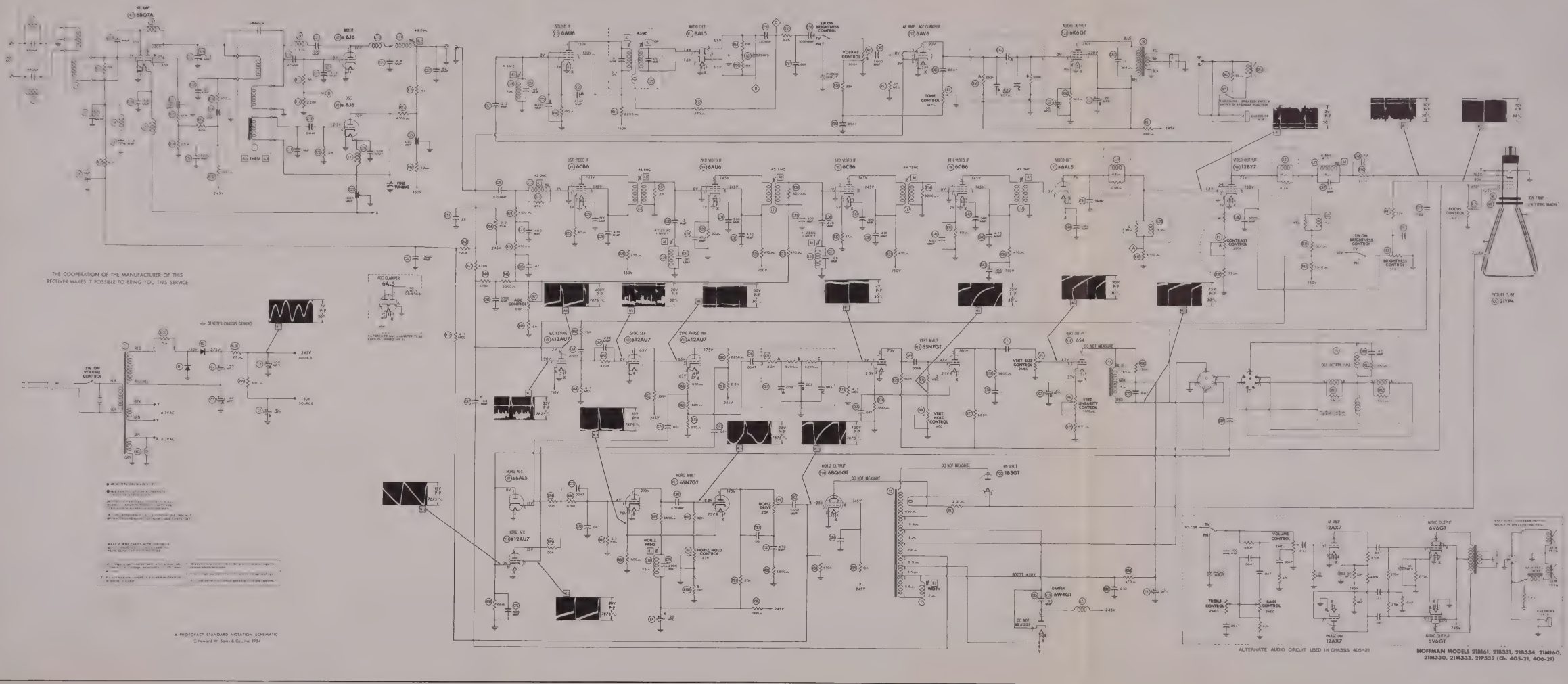
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ALTERNATE AUDIO CIRCUIT USED IN CHASSIS 405-21
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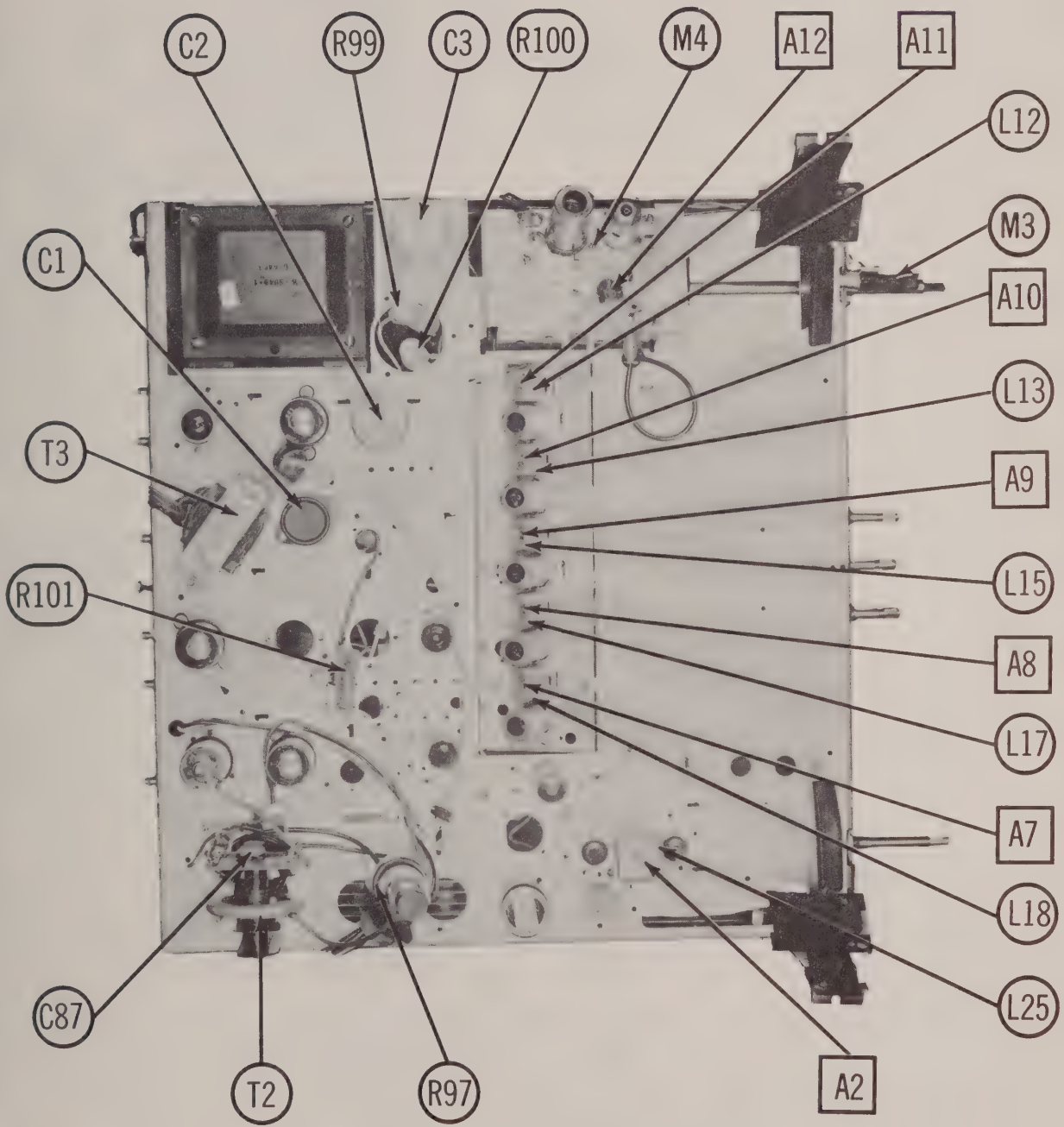

CHASSIS TOP VIEW

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HOFFMAN MODELS 21B161, 21B331, 21B334, 21M160, 21M330, 21M333, 21P332 (Ch. 405-21, 406-21)

CHASSIS BOTTOM VIEW-CAPACITOR IDENTIFICATION

TUBE PLACEMENT CHART

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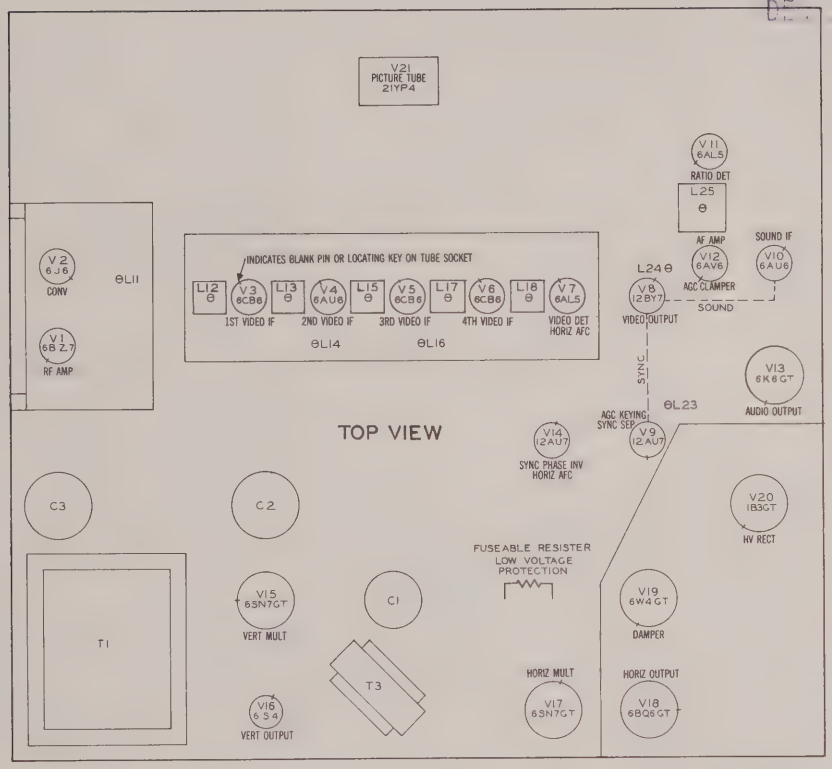

TUBE FAILURE CHECK CHART

The following chart lists tubes whose failures are most likely to produce the indicated symptoms. Refer to tube placement chart for location and type of tube.

POWER SUPPLY FAILURE
No raster, no sound - Selenium Rectifiers (M1 & M2)

LOSS OF PICTURE OR SOUND
No pic, no sound, has raster - V2, V3, V4, V5, V6, V7
No pic, no sound, has snow - V1, V2, V3
No pic, has sound, has raster - V8, V21
Has pic, no sound - V10, V11, V12, V13
Overloaded picture - V9, V12

SYNC FAILURE
No vert. sync - V14, V15
No horiz. sync - V7, V14, V17
No vert. or horiz. sync - V9, V14

SWEEP FAILURE
No raster, has sound - V17, V18, V19, V20, V21
No vertical deflection - V15, V16
Poor vert. linearity or foldover - V15, V16
Poor horiz. linearity or foldover - V17, V18, V19
Narrow picture - V17, V18, V19, V20, M1, M2
Vert. off freq. - V14, V15
Horiz. off freq. - V7, V14, V17

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Use an isolation transformer to protect the test equipment.
The high voltage shock hazard may be eliminated by removing the horizontal output tube (V18) or by connecting the negative lead of a 60 volt supply to pin 5 (grid) of V18. Connect the positive side to chassis.
Turn the tuner selector to a point between any two channels so that the detent roller rest on one of the high points of the drum disc. Connect a .001MFD capacitor across the vertical input terminals of the oscilloscope.

SOUND IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
1.	.005MFD	High side to point Ⓐ. Low side to chassis.	4.5MC (Unmod)	Between Any two channels	DC probe thru 10KΩ to point Ⓑ. Common to chassis.	A1, A2	Attenuate gener ator output to maintain 4 to 7 volts on VTVM. Adjust for maximum deflection.
2.	"	"	"	"	DC probe thru 10KΩ to point Ⓒ. Common to chassis.	A3	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting.

SOUND IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use frequency modulated signal with 60% modulation and 450KC sweep. Use 120% sawtooth voltage in scope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
1.	.005MFD	High side to point Ⓐ. Low side to chassis.	4.5MC (450KC Swp)	4.5MC	Between Any two Channels	Vert. Amp. thru 10KΩ to point Ⓑ. Low side to chassis.	A1, A2	Disconnect stabilizing capacitor C6. Adjust for curve of maximum amplitude and symmetry similar to Fig. 1.
2.	"	"	"	"	"	Vert. Amp. thru 10KΩ to point Ⓒ. Low side to chassis.	A3	Reconnect stabilizing capacitor C6. Adjust so that 4.5MC occurs at center of cross-over lines as in Fig. 2. SLIGHTLY re-touch A2 for maximum amplitude and straightness of crossover lines.

4.5MC TRAP ALIGNMENT

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
3.	.005MFD	High side to point Ⓐ. Low side to chassis.	4.5MC (Unmod)	Between Any two channels	DC probe thru detector (Fig.3) to pin 11 (cathode) of picture tube. Low side to chassis.	A4	Adjust for MINIMUM deflection.

VIDEO IF ALIGNMENT

Connect the negative lead of a 3 volt battery to the ungrounded side of C50. Connect the positive lead to chassis.
Set the contrast control to maximum contrast position. Attenuate generator output to maintain 1 volt on VTVM.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
4.	Direct	High side to an ungrounded tube shield floating over converter tube (V2). Low side to chassis.	41.25MC (Unmod)	Between any two channels	DC probe thru 10KΩ to point Ⓐ. Common to chassis.	A5	Adjust for MINIMUM deflection.
5.	"	"	47.25MC	"	"	A6	"
6.	"	"	43.0MC	"	"	A7	Adjust for maximum deflection.
7.	"	"	44.75MC	"	"	A8	"
8.	"	"	42.5MC	"	"	A9	"
9.	"	"	45.6MC	"	"	A10	"
10.	"	"	43.0MC	"	"	A12	Adjust for MINIMUM deflection.
11.	"	"	43.0MC	"	"	A11	Adjust for maximum deflection.
12.	"	"	45.0MC	"	"	A12	Adjust for maximum deflection. Repeat step 4 thru 12 until no further increase in meter deflection is obtained.

OVERALL VIDEO IF RESPONSE CHECK

Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
13.	Direct	High side to ungrounded tube shield floating over converter tube (V2). Low side to chassis.	43.5MC (10MC Swp)	41.25MC 42.5MC 45.75MC	Between any two channels	Vert. Amp. thru 10KΩ to point Ⓐ. Low side to chassis.		Check for response curve similar to Fig.4. If necessary, retouch A7 thru A12 to obtain desired response.

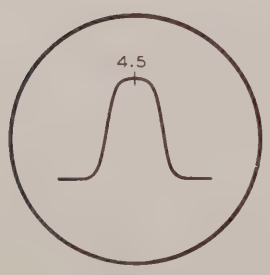

FIG. 1

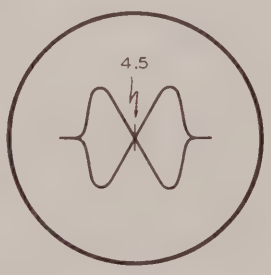

FIG. 2

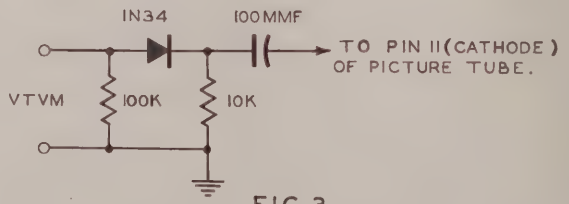

FIG. 3

ALIGNMENT INSTRUCTIONS (cont)

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DENVER, [illegible]

OSCILLATOR ALIGNMENT

Replace V3 tube shield to its original position.
The channel oscillator adjustment screws are reached thru a hole just to the right of the channel switch shaft. The correct adjustment screw is accessible thru this hole as the channel switch is turned to each channel.
Leave bias connected as under "Video IF Alignment" and connect a jumper from the ungrounded side of C50 to the tuner AGC terminal.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Set the fine tuning control to the mid-position of its range.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
14.	Two 120Ω Carbon Resistors	Across antenna terminals with 120Ω in each lead.	213MC (10MC Swp)	211.25MC 215.75MC	13	Vert. Amp. thru 10KΩ to point (A). Low side to chassis.	A13	Adjust to place sound marker in trap notch as in Fig. 5. Video marker should be at 50%.
			207MC (10MC Swp)	205.25MC 209.75MC	12		A14	
			201MC (10MC Swp)	199.25MC 203.75MC	11		A15	
			195MC (10MC Swp)	193.25MC 197.75MC	10		A16	
			189MC (10MC Swp)	187.25MC 191.75MC	9		A17	
			183MC (10MC Swp)	181.25MC 185.75MC	8		A18	
			177MC (10MC Swp)	175.25MC 179.75MC	7		A19	
			85MC (10MC Swp)	83.25MC 87.75MC	6		A20	
			79MC (10MC Swp)	77.25MC 81.75MC	5		A21	
			69MC (10MC Swp)	67.25MC 71.75MC	4		A22	
			63MC (10MC Swp)	61.25MC 65.75MC	3		A23	
			57MC (10MC Swp)	55.25MC 59.75MC	2		A24	

RF AND MIXER ALIGNMENT

Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
15.	Two 120Ω Carbon Resistors	Across antenna terminals with 120Ω in each lead.	207MC (10MC Swp)	205.25MC 209.75MC	12	Vert. Amp. thru 10KΩ to point (A). Low side to chassis.	A25 A26 A27	Adjust for response curve similar to Fig. 6, with markers above 90%.
16.	"	"	213MC (10MC Swp)	211.25MC 215.75MC	13	"		Check for response similar to Fig. 6. If markers fall below 70% on any channel make SLIGHT compromise adjustments of A25, A26 and A27 with channel switch set to that channel, then check all other channels to see that they have not been seriously affected.
			201MC (10MC Swp)	199.25MC 203.75MC	11			
			195MC (10MC Swp)	193.25MC 197.75MC	10			
			189MC (10MC Swp)	187.25MC 191.75MC	9			
			183MC (10MC Swp)	181.25MC 185.75MC	8			
			177MC (10MC Swp)	175.25MC 179.75MC	7			
			85MC (10MC Swp)	83.25MC 87.75MC	6			
			79MC (10MC Swp)	77.25MC 81.75MC	5			
			69MC (10MC Swp)	67.25MC 71.75MC	4			
			63MC (10MC Swp)	61.25MC 65.75MC	3			
			57MC (10MC Swp)	55.25MC 59.75MC	2			

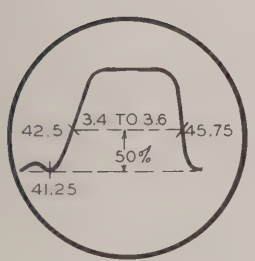


FIG.4

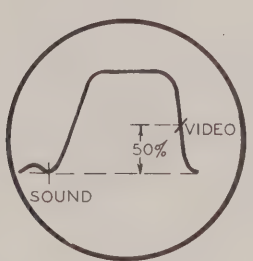


FIG.5

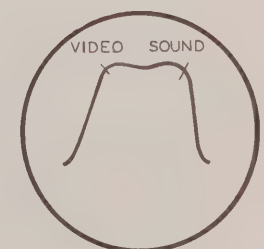


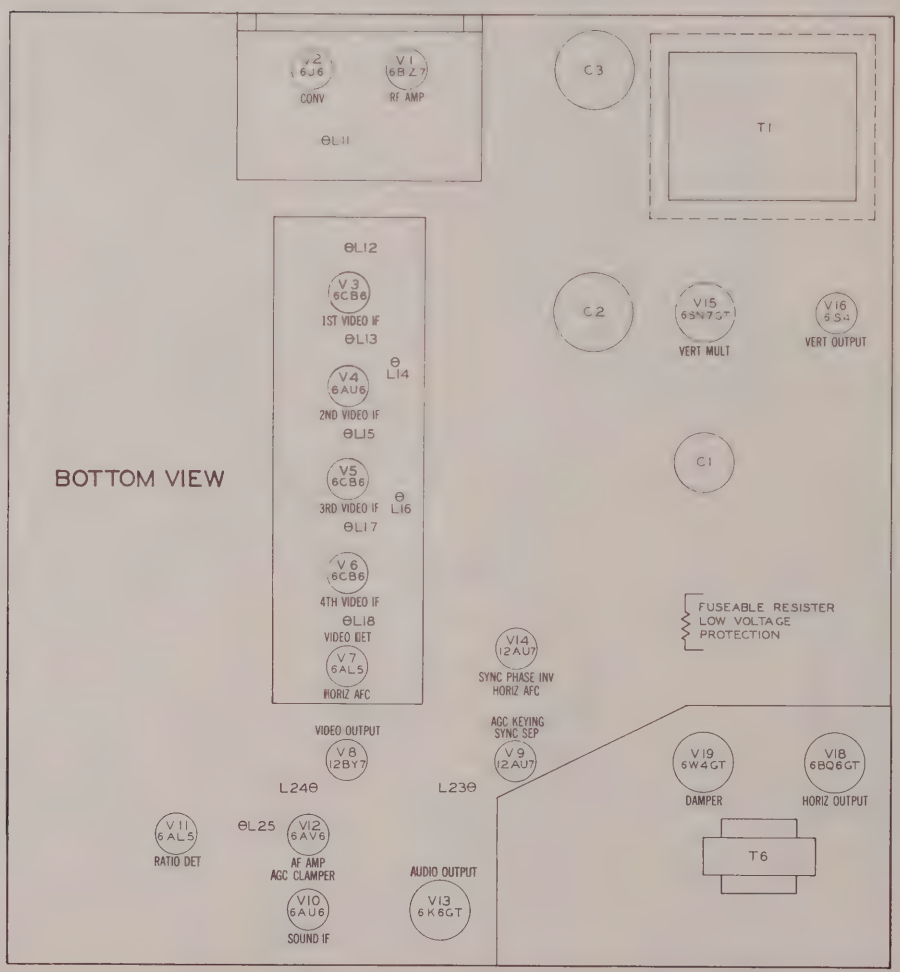
FIG.6

HOFFMAN MODELS 21B161, 21B331, 21B334, 21M160, 21M330, 21M333, 21P332 (Ch. 405-21, 406-21)

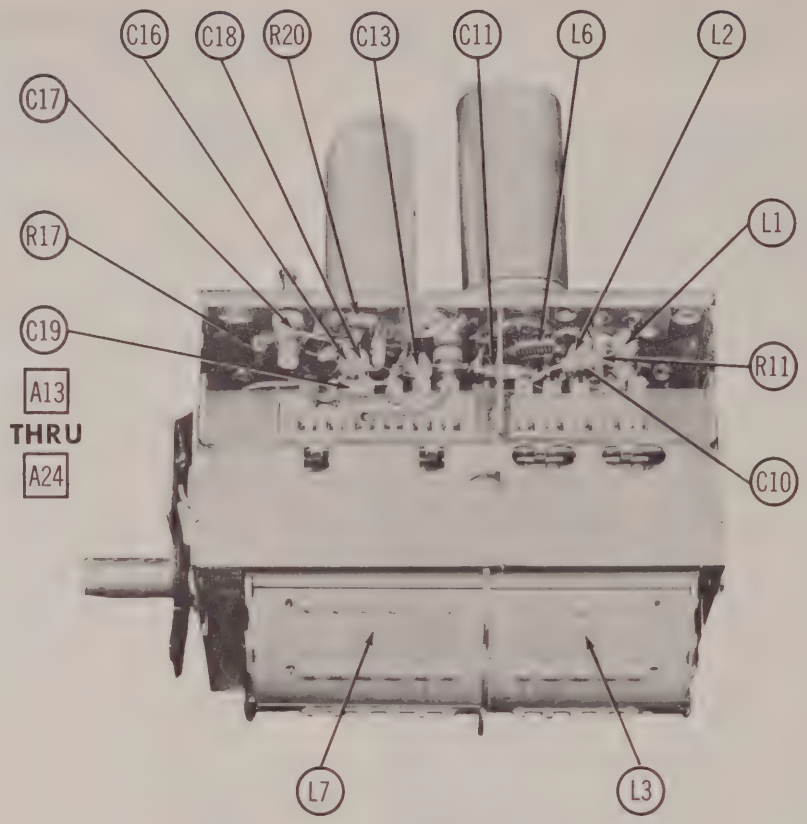
RESISTANCE MEASUREMENTS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	6BZ7	INF	1.7Meg	0Ω	.1Ω	0Ω	†1.5KΩ	300KΩ	INF	0Ω
V 2	6J6	†6.5KΩ	†6.7KΩ	.1Ω	0Ω	235KΩ	10KΩ	0Ω		
V 3	6CB6	100KΩ	47Ω	.1Ω	0Ω	†2KΩ	†2KΩ	0Ω		
V 4	6AU6	0Ω	0Ω	.1Ω	0Ω	†2KΩ	†2KΩ	120Ω		
V 5	6CB6	100KΩ	47Ω	.1Ω	0Ω	†2KΩ	†2KΩ	0Ω		
V 6	6CB6	0Ω	180Ω	.1Ω	0Ω	†2KΩ	†2KΩ	0Ω		
V 7	6AL5	0Ω	22Ω	.1Ω	0Ω	5.3Meg	0Ω	4.7KΩ		
V 8	12BY7	100Ω	4.7KΩ	0Ω	0Ω	0Ω	.1Ω	†7KΩ	†1.6KΩ	0Ω
V 9	12AU7	†330KΩ	5.2Meg	0Ω	0Ω	0Ω	570KΩ	†4.8KΩ	†1.1KΩ	.1Ω
V 10	6AU6	1Ω	150Ω	.1Ω	0Ω	†3.2KΩ	†3.7KΩ	150Ω		
V 11	6AL5	INF	INF	.1Ω	0Ω	10KΩ	0Ω	10KΩ		
V 12	6AV6	10Meg	0Ω	0Ω	.1Ω	650KΩ	650KΩ	†250KΩ		
V 13	6K6GT	†1KΩ	0Ω	†1.5KΩ	†1KΩ	500KΩ	INF	.1Ω	560Ω	
V 14	12AU7	†4.5KΩ	†330KΩ	3.9KΩ	0Ω	0Ω	5.3Meg	5.3Meg	22Ω	.1Ω
V 15	6SN7GT	4.7Meg	▲180KΩ	1KΩ	1.6Meg	▲680KΩ	1KΩ	.1Ω	0Ω	
V 16	6S4	INF	2KΩ	1.2Meg	0Ω	.1Ω	1.2Meg	INF	INF	▲2KΩ
V 17	6SN7GT	4.7Meg	†6.5KΩ	1.5KΩ	120KΩ	†120KΩ	1.5KΩ	.1Ω	0Ω	
V 18	6BQ6GT	1.7Meg	0Ω	▲30Ω	†10KΩ	470KΩ	5.6KΩ	.1Ω	0Ω	TOP CAP ▲18Ω
V 19	6W4GT	INF	INF	650KΩ	INF	†120Ω	650KΩ	▲33Ω	▲33Ω	
V 20	1B3GT		PINS	1 - 8	HAVE	INF	RESISTANCE			TOP CAP ▲470Ω
V 21	2I4P4	0Ω	†40KΩ	PIN 6 ▲470Ω	PIN 10 ▲470Ω	PIN 11 †330KΩ	PIN 12 .1Ω			

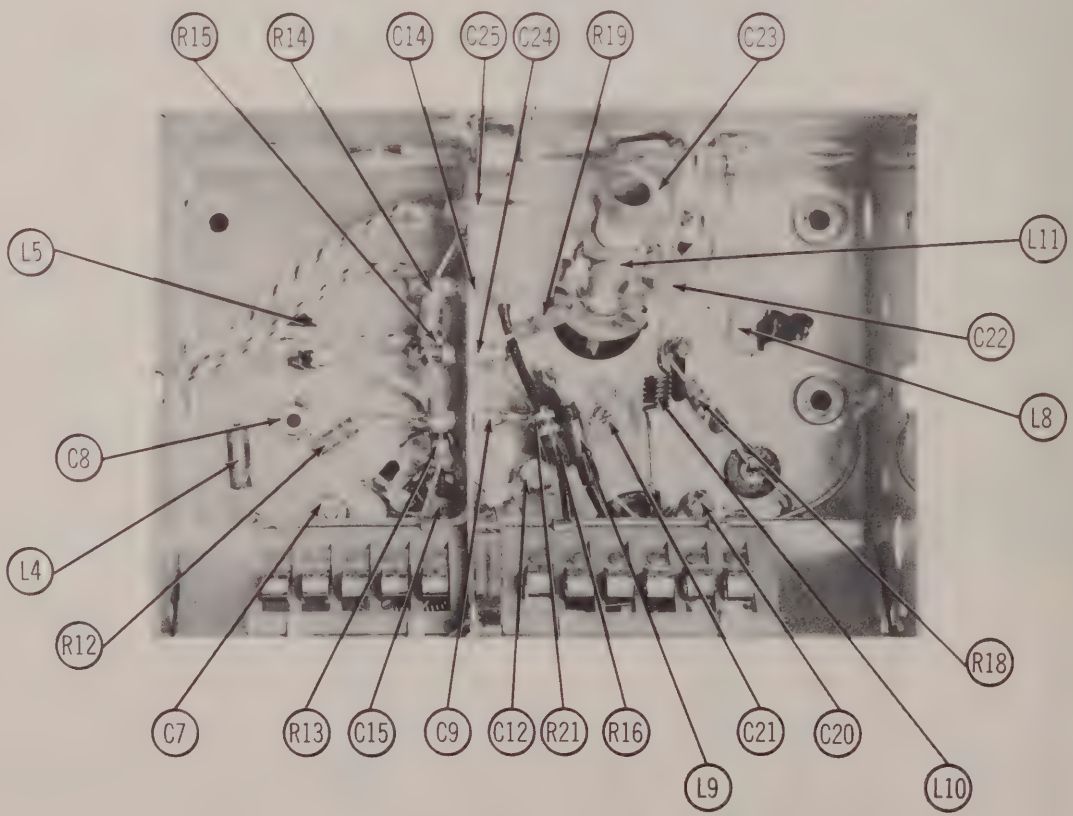
† MEASURED FROM JUNCTION OF C1 & M2
▲ MEASURED FROM PIN 3 OF V19



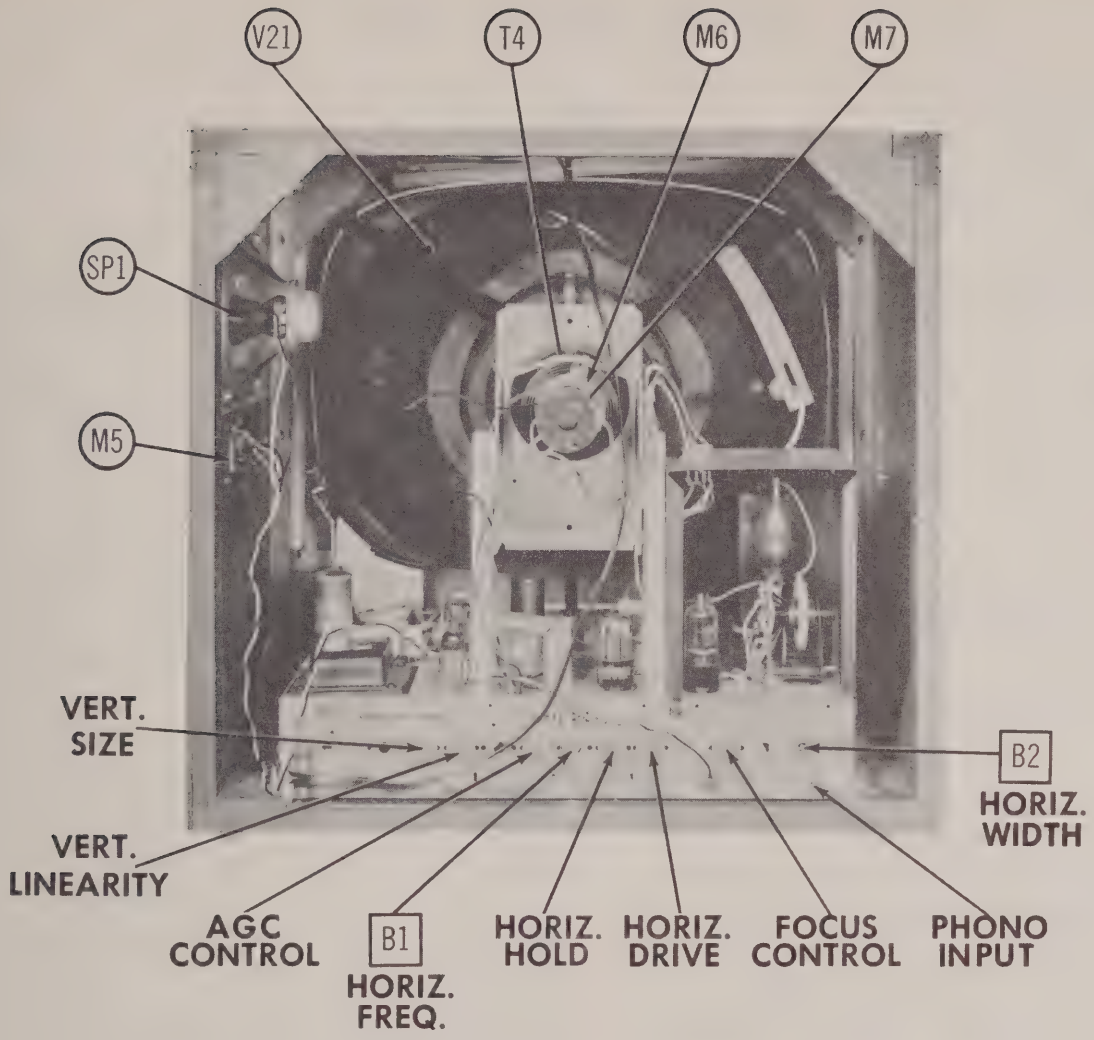
TUBE PLACEMENT CHART



RF TUNER-RIGHT SIDE



RF TUNER-BOTTOM VIEW



CABINET—REAR VIEW

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

Turn the set on and tune in a TV station, preferably a test pattern.

Turn the horizontal drive control clockwise as far as possible without the presence of vertical white lines or compression near the center of the picture.

Set the horizontal hold control to its mid-range position.

Adjust the horizontal frequency slug (B1) counter clockwise while switching on and off channel until picture loses sync. Turn B1 clockwise and note the number of diagonal bars just before sync pull-in. There should not be less than 2 bars if the horizontal section is operating normally. Continue turning B1 clockwise, while switching on and off channel, until sync is lost again. Then turn B1 counter clockwise and note the point where sync pull-in occurs. Turn B1 an additional half turn counter clockwise.

Adjust the width slug (B2) for a picture SLIGHTLY wider than necessary to fill the picture mask horizontally.

TROUBLE SHOOTING AIDS

SWEEP

HORIZONTAL

LOSS OF SWEEP

Follow procedure outlined under "Loss of High Voltage".

INSUFFICIENT SWEEP

Check by substitution V18 and V19. Check M1 and M2. Check C83, R95, T2, T4A. Check adjustments R9, B2 and other associated components.

DRIVE LINES

Check by substitution V18 and V19. Adjust B2 and R9. Check C82, C83, R93, T2, T4A and other associated components.

COMPRESSED LEFT SIDE

Check by substitution V18 and V19. Check the horizontal output and damper stages for component failure or change of value.

FOLDS

Follow procedure outlined under "Drive Lines".

PIE CRUST EFFECT

Check by substitution V17, V18 and V19. Check C78 for open. Check L26, C79 and other associated components.

XMAS TREE EFFECT

Check by substitution V17, V18 and V19. Check T2 and T4 for arcing. Check L26, C79, C80, C81, R94, R88 and other associated components.

VERTICAL

LOSS OF SWEEP

Check by substitution V15 and V16. Check waveform W9.

If Satisfactory	If Unsatisfactory
Check T3, R80, C72, T4B and other associated components.	Check R5, R78, R77, R75, C71, C69 and other associated components.

INSUFFICIENT SWEEP

Check vertical size and vertical linearity controls for proper adjustment. Check by substitution V15 and V16. If still unsatisfactory, proceed as outlined under "Loss of Sweep".

COMPRESSED AT BOTTOM

Check by substitution V15 and V16. Check R5, R75, R77, C71 and other associated components.

COMPRESSED AT TOP

Check by substitution V15 and V16. Check R79, R6, C2D and other associated components.

FOLDS

Check by substitution V15 and V16. Check T3, T4B, R78, C70 and other associated components.

SYNC

LOSS OF VERTICAL AND HORIZONTAL SYNC

Check by substitution V9 and V14. Check C64, R65, R67, R66 and other associated components.

LOSS OF VERTICAL SYNC-HORIZONTAL SYNC SATISFACTORY

Check by substitution V14 and V15. Check waveform W7.

If Satisfactory	If Unsatisfactory
Check C68, C69, R76, R4, R75, R77 and other associated components.	Check vertical integrator network and other associated components. Check IF stages for overloading.

LOSS OF HORIZONTAL SYNC-VERTICAL SYNC SATISFACTORY

Check by substitution V7, V14 and V17. Check waveform W13.

If Satisfactory	If Unsatisfactory
Check components associated with V17 especially C77, C4 and R86.	Check C75, C74, C76, R84, R85 and other associated components.

HORIZONTAL BENDING

Check by substitution V9, V14, V7 and V17. Check horizontal AFC network and other associated components. Check video IF alignment.

VIDEO

LOSS OF VIDEO

Substitute V8. Check components associated with V8. Check picture tube. Check AGC network.

SOUND BARS (4.5MC BEAT)

Adjust tuner fine tuning for best sound and picture. Adjust A4. Check video IF alignment.

POOR CONTRAST

Substitute V8. Check video detector network. Check picture tube and other associated components.

NEGATIVE PICTURE

Check by substitution V3, V5, V7, V8, and V9. Check picture tube. Check video detector network and other associated components.

SMEAR

Substitute V8. Check L19, L20, L21, C48, R40 and other associated components.

WIDE BLACK BAR ACROSS PICTURE

Check by substitution V1, V3, V4, V5, V6, V7 and V8. for heater to cathode leakage.

AUDIO

WEAK OR NO SOUND

Check by substitution V10, V11, V12 and V13. Check stages V12 and V13 using audio signal generator. Apply audio signal across R1B.

If Satisfactory	If Unsatisfactory
Check switch on brightness control for TV position. Check ratio detector network, audio IF alignment and other associated components.	Check switch M5. Check C62A BC, T6, C63, R61, speaker and other associated components.

BUZZ

Adjust tuner fine tuning for best sound and picture. Check adjustment A3 for minimum buzz. If still unsatisfactory, check audio IF alignment.

DISTORTED

Follow procedure outlined under "Weak or No Sound".

PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO

HOFFMAN MODELS 21B161, 21B331, 21B334, 21M160, 21M330, 21M333, 21P332 (Ch. 405-21, 406-21)

ALTERNATE TUNER SCHEMATIC

PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No	USE	REPLACEMENT DATA: HOFFMAN PART No.	STANDARD REPLACEMENT	RETMA BASE TYPE	NOTES
V1	RF Amplifier	6BZ7	6BZ7	9AJ	6BQ7 used in some sets
V2	Converter	6J6	6J6	7BF	
V3	1st, Video IF Amp.	6CB6	6CB6	7CM	
V4	2nd, Video IF Amp.	6AU6	6AU6	7BK	
V5	3rd, Video IF Amp.	6CB6	6CB6	7CM	
V6	4th, Video IF Amp.	6CB6	6CB6	7CM	
V7	Video Det.,- Horiz. AFC	6AL5	6AL5	6BT	
V8	Video Output	12BY7	12BY7	9BF	
V9	AGC Keying - Sync Separator	12AU7	12AU7	9A	
V10	Sound IF Amp.	6AU6	6AU6	7BK	
V11	Ratio Det.	6AL5	6AL5	6BT	
V12	AF Amplifier - AGC Clamper	6AV6	6AV6	7BT	Chassis 405-21 uses a 12AX7 Chassis 405-21 uses a 6AL5 Chassis 405-21 uses two 6V6GT
V13	Audio Output	6K6GT	6K6GT	7S	
V14	Sync Phase Inv.- Horiz. AFC	12AU7	12AU7	9A	
V15	Vert. Mult.	6SN7GT	6SN7GT	8BD	
V16	Vert. Output	6S4	6S4	9AC	
V17	Horiz. Mult.	6SN7GT	6SN7GT	8BD	
V18	Horiz. Output	6BQ6GT	6BQ6GT	9AM	
V19	Damper	6W4GT	6W4GT	4CG	
V20	HV Rectifier	1B3GT	1B3GT	3C	

CATHODE-RAY TUBE

ITEM No	REPLACEMENT DATA: HOFFMAN PART No.	CBS-HYTRON PART No.	GENERAL ELECTRIC PART No.	SYLVANIA PART No.	WESTINGHOUSE PART No.	RETMA BASE TYPE	NOTES
V21	21TP4	21YP4 21YP4A	21FP4 21YP4A	21YP4 21YP4A 21FP4 ①	21TP4 21YP4A	12L 12L 12M	① Circuit changes necessary

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	VOLT	HOFFMAN PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C1	≋40	150	4246	AFE51-70		XA004		FPU7	TVL-3442	
C2A	≋40	150	4270	E4D736				FP343	TVL-4406	
B	≋40	150						2X520		
C	≋50	50								
D	50	50								
C3A	≋100	300	4371	AFH2-106		B028		FP255	TVL-3810	
B	≋20	300								
C4	20	450		PRS450/20		BR3045		TC75	TVA-1709	Note 1
C5	10	600	4254	PRS600/10		BR4610		TC92	R1222	
C6	5	50	4300	PRS150/4		BR550		TC30	TVA-1303	
C7	3-9				829-j0	3139-01-GR5				
C8	3-9				829-j0	3139-01-GR5				
C9	1000			EF-001		MFT-1000			503C-D1	
C10	3			S13.3NP0	TCZ-3	Z001	NP0K-030	ZT-5S53	5TCCB-V33	
C11	1000			EF-001	MFT-1000				503C-D1	
C12	.5-3				829-3	3115-01-GR5	CT565A			
C13	120			BPD-00012	D5-121	G044	GP3K-121	UC-5312	5GA-T12	
C14	1000			EF-001	MFT-1000				503C-D1	
C15	1500			BPD-0015	DD-152	K071	801-0015	DC-5215	5HK-D15	
C16	47			BPD-000047	D5-471	G023	801-470	UC-5347	5GA-T47	
C17	.5-3				829-3	3115-01-GR5	CT565A			
C18	10			SI10NP0	TCZ-10	Z018	NP0K-100	ZT-541	5TCC-Q1	
C19	5									
C20	1500			BPD-0015	DD-152	K071	801-0015	DC-5215	5HK-D15	
C21	1500			BPD-0015	DD-152	K071	801-0015	DC-5215	5HK-D15	
C22	6.8			SI6.8NP0	TCZ-6.8	Z013	NP0K-6R8	ZT-5568	5TCCB-V68	
C23	62									
C24	1000			EF-001	MFT-1000				503C-D1	
C25	1000			EF-001	MFT-1000				503C-D1	
C26	470		14050	S2470	D5-471	TP48	GP2K-471	UC-5347	5GA-T47	
C27	1500		14030	BPD-0015	DD-152	K071	801-0015	DC-5215	5HK-D15	
C28	470		14050	S2470	D5-471	TP48	GP2K-471	UC-5347	5GA-T47	
C29	1500		14030	BPD-0015	DD-152	K071	801-0015	DC-5215	5HK-D15	
C30	1.2		14080							
C31	30	500		1469-00002		2BR3Q2			MS-42	
C32	470		14050	S2470	D5-471	TP48	GP2K-471	UC-5347	5GA-T47	
C33	470		14050	S2470	D5-471	TP48	GP2K-471	UC-5347	5GA-T47	
C34	1500		14030	BPD-0015	DD-152	K071	801-0015	DC-5215	5HK-D15	
C35	1500		14030	BPD-0015	DD-152	K071	801-0015	DC-5215	5HK-D15	
C36	3.9									
C37	300	500		1469-0001		2BR5T1		MCB235	MS-31	
C38	470		14050	S2470	D5-471	TP48	GP2K-271	UC-5347	5GA-T47	
C39	1500		14030	BPD-0015	DD-152	K071	801-0015	DC-5215	5HK-D15	
C40	470		14050	S2470	D5-471	TP48	GP2K-471	UC-5347	5GA-T47	
C41	1500		14030	BPD-0015	DD-152	K071	801-0015	DC-5215	5HK-D15	
C42	1500		14030	BPD-0015	DD-152	K071	801-0015	DC-5215	5HK-D15	
C43	1500		14030	BPD-0015	DD-152	K071	801-0015	DC-5215	5HK-D15	
C44	1500		14030	BPD-0015	DD-152	K071	801-0015	DC-5215	5HK-D15	
C45	5		4051	S25	D5-050	TP06	GP1K-050	UT-585	5HK-V5	
C46	5000		4039	BPD-005	DD-502	K080	81L-005	DC-525	5HK-D5	
C47	47			S47NP0	TCZ-47	Z033	NP0K-470	ZT-5447	5TCC-Q47	
C48	.22	200	4131	P488-22		CUB4P22		PT4022	4TM-P22	
C49	5000		4039	BPD-005	DD-502	K080	81L-005	DC-525	5HK-D5	
C50	.47	200	4173	P288-47		CUB2P47		PT7447	2TM-P47	
C51	.22	200	4131	P488-22		CUB4P22		PT4022	4TM-P22	
C52	5000		4039	BPD-005	DD-502	K080	81L-005	DC-525	5HK-D5	
C53	2.2		4069	SI2.2NP0	TCZ-2.2	TZ05	NP0K-2R2		5TCCB-V22	
C54	68		4048							
C55A	4000		4038	BPD-2X004	D5-402	DK078	GP2-333-402	DCD-524	5HK-2D4	
B	4000				D5-402		GP2-333-402			
C56	320		4065	SI330	D5-331	TP43	GP2K-331	UC-5333	5GA-T33	
C57	.001	400	4174	P588-001	D5-102	CUB5D1	GP2L-102	PT501	5TM-D1	
C58	5000		4039	BPD-005	DD-502	K080	81L-005	DC-525	5HK-D5	
C59	.0047	400	4127	P588-0047	D5-472	CUB5D47	GP2-333-472	PT5247	5TM-D47	

PARTS LIST AND DESCRIPTIONS

CAPACITORS (cont)

ITEM No	RATING: CAP.	VOLT	HOFFMAN PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C60	5000		4039	BPD-005	DD-502	K080		81L-005	5HK-D5	
C61	.0047	400	4127	P588-0047	D5-472	CUB5D47	GP2-333-472	PT5247	5TM-D47	
C62A	.01									
B†	250		†5000	†PA-113-4	†PC-81	†113TM2	†1494-02		†T-3	
C										
C63	.01	600	4105	P688-01	D5-103	CUB6D1	GP2-333-103	PT611	6TM-P1	
C64	.0022	400	4128	P688-0022	D5-222	CUB6D22	GP2-333-222	PT6222	6TM-D22	
C65	250		4020	BPD-00022	D5-221	K081		81L-005	5GA-T22	
C66	.0047	400	4127	P688-0047	D5-472	CUB6D47	GP2-333-472	PT6247	6TM-D47	
C67A	.001							PT632		
B	.005		≋9005	≋PA-110	≋PC-100	≋115M1	≋1405-01	PT635	≋V-1	
C	.006							PT636		
C68	.047	200	4158	P288-047	D7-503	CUB2S47		PT7447	2TM-S47	
C69	.0039	600	14113	1464-004		1H5D39		MCB463	MS-34	
C70	.1	600	4144	P688-1	DF-104	CUB6P1		PT601	6TM-P1	
C71	.1	600	4144	P688-1	DF-104	CUB6P1		PT601	6TM-P1	
C72	.047	600	4133	P688-047	DF-503	CUB6S47		PT6147	6TM-S47	
C73	.022	600	4124	P688-022	DF-203	CUB6S22	81T-02	PT6123	6TM-S23	
C74	.001	400	4175	P688-001	D5-102	CUB6D1	GP2L-102	PT601	6TM-D1	
C75	.001	400	4175	P688-001	D5-102	CUB6D1	GP2L-102	PT601	6TM-D1	
C76	3500		14030	BPD-0015	DD-152	K071	801-0015	DC-5215	5HK-D15	
C77	.0047	400	4185	P688-0047	D5-472	CUB6D47	GP2-333-472	PT6247	6TM-D47	
C78	.047	400	4158	P488-047	DF-503	CUB4S47		PT4147	4TM-S47	
C79	3900	500	4045	1464-004		1H5D39		MCB463	MS-34	
C80	470	500	14008	1469-0005		1R5T47		MCB245	MS-35	
C81	.001	600	4175	P688-001	D5-102	CUB6D1	GP2L-102	PT601	6TM-D1	
C82	470	500	14008	1469-0005		1R5T47		MCB245	MS-35	
C83	5000		4039	BPD-005	DD-502	K080	81L-005	DC-525	5HK-D5	
C84	.1	400	4150	P488-1	DF-104	CUB4P1		PT401	4TM-P1	
C85	100	3000	14063	HVD30-0001	DD30-101		83KV-101		30GA-T1	
C86	.033	600	14158	P688-033				PT6133		
C87	68	4000		HVD60-000068						Note 2
C88	.1	600	4144	P688-1	DF-104	CUB6P1		PT601	6TM-P1	
C89	47	3000	14088	HVD30-000047	DD30-470		83KV-470		30GA-Q47	
C90	5000		4039	BPD-005	DD-502	K080	81L-005	DC-525	5HK-D5	
C91	.1	600	4144	P688-1	DF-104	CUB6P1		PT601	6TM-P1	Note 3

† Items C62A, C62B, C63C, R59A, R59B are combined in one unit.
When replacing items separately, C62B and C62C should total 350MMF.
• Items C67A, C67B, C67C, R71A, R71B, R71C are combined in one unit.
Note 1. Some models use 10MFD in this application.
Note 2. Some models use 47MMF in this application.
Note 3. Used only in chassis 405-21.

CONTROLS

ITEM No	RATING: RESISTANCE	WATTS	HOFFMAN PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	500KΩ		H4910	•QJ-527	RTV-483		UF551	Contrast - Panel
B	500KΩ						UR55-T154 †	Volume-tapped@120KΩ-rear
C	Switch						UB-27	Attach to R1B
R2A	1Meg		H4668	QU-137	A47-1Meg-S	AB-09	U-54	Tone - Notes 1 and 2
B	Shaft		Not Req.	Not Req.	KBS-3	AK-4	Not Req.	Attach to R2A
R3A	50KΩ		H4929					Brightness & phono switch
B	Shaft		H4668	QU-137	A47-1Meg-S	AB-09	U-54	Vert. Hold
R4A	1Meg		Not Req.	Not Req.	KBS-3	AK-4	Not Req.	Attach to R4A
B	Shaft		Not Req.	QU-139	A47-2Meg-S	AB-75	SU-56	Vert.Size
R5A	2Meg		H4669	QU-139	A47-2Meg-S	AB-75	SU-56	Attach to R5A
B	Shaft		Not Req.	Not Req.	FKS-1/4	AK-1	Not Req.	Vert. Linearity
R6A	5000Ω		H-4685	QU-114	A47-5000-S	AB-10	SU-16	Attach to R6A
B	Shaft		Not Req.	Not Req.	FKS-1/4	AK-1	Not Req.	Attach to R6A
R7A	100KΩ		H4849	QU-128	A47-100K-S	AB-40	SU-41	AGC
B	Shaft		Not Req.	Not Req.	FKS-1/4	AK-1	Not Req.	Attach to R7A
R8A	25KΩ		H-4859	QU-130	A47-25K-S	AB-26	SU-29	Horiz. Hold
B	Shaft		Not Req.	Not Req.	FKS-1/4	AK-1	Not Req.	Attach to R8A
R9A	25KΩ		H-4859	QU-130	A47-25K-S	AB-26	SU-29	Horiz. Drive
B	Shaft		Not Req.	Not Req.	FKS-1/4	AK-1	Not Req.	Attach to R8A
R10A	2Meg		H4664	QU-139	A47-2Meg-S	AB-75	SU-56	Focus
B	Shaft		Not Req.	Not Req.	FKS-1/4	AK-1	Not Req.	Attach to R10A

* CONCENTRIKIT EQUIVALENT KIT K-2 BASE ELEMENTS & SHAFTS B1J-103 & P1-204 (Panel)
B1J-133X & R1-323 (Rear) & SWITCH 76-1.
Note 1, Chassis 405-21 uses a 2Meg bass control, Hoffman part #H4914.
Note 2, Chassis is 405-21 use a 2Meg treble control, Hoffman part #H4914.
† Universal replacement (Mallory exact duplicate part #UE-75).

RESISTORS

ITEM No	RATING: OHMS	WATT	HOFFMAN PART No.	IRC PART No.	NOTES
R11	15KΩ			BTS-15K	
R12	47KΩ			BTS-47K	
R13	100KΩ			BTS-100K	
R14	270KΩ			BTS-270K	
R15	180KΩ			BTS-180K	
R16	470Ω			BTS-470	
R17	15KΩ			BTS-15K	
R18	220KΩ			BTS-220K	
R19	5.6KΩ			BTS-5K	
R20	10KΩ			BTS-10K	
R21	470Ω			BTS-470	
R22	47KΩ 5%		4537	BTS-47K 5%	
R23	470KΩ		4576	BTS-470K	
R24	470Ω		4064	BTS-470	
R25	47Ω		4039	BTS-47	
R26	470Ω		4064	BTS-470	
R27	12KΩ 5%		4656	BTS-12K 5%	
R28	120Ω		4546	BTS-120	
R29	470Ω		4064	BTS-470	
R30	82000Ω 5%		4641	BTS-82000 5%	
R31	470Ω		4064	BTS-470	
R32	47Ω		4039	BTS-47	
R33	470Ω		4064	BTS-470	
R34	82000Ω 5%		4641	BTS-82000 5%	
R35	180Ω		14618	BTS-180	
R36	470Ω		4064	BTS-470	
R37	4700Ω		4049	BTS-4700	
R38	33Ω		4698	BTS-33	
R39	1500Ω 5%		4610		
R40	330KΩ 5%			BTS-330K 5%	
R41	22KΩ		4501	BTS-22K	
R42	15KΩ		4619	BTS-15K	
R43	3300Ω		4612	BTS-3300	
R44	470KΩ		4506	BTS-470K	
R45	3300Ω		4612	BTS-3300	
R46	15KΩ		4619	BTS-15K	
R47	470KΩ		4064	BTS-470K	
R48	120KΩ		4548	BTS-120K	
R49	150Ω		4616	BTS-150	
R50	150Ω		4616	BTS-150	
R51	2200Ω		4650	BTS-2200	
R52	270Ω		4663	BTS-270	
R53	33KΩ		4588	BTS-33K	
R54	10KΩ		4597	BTS-10K	
R55	10KΩ		4597	BTS-10K	
R56	33KΩ			BTS-33K	
R57	10Meg			BTS-10Meg	
R58	2.2Meg		14620	BTS-2.2Meg	
R59A	250KΩ		†5000		
B†	500KΩ				

RESISTORS (cont)

ITEM No.	RATING: OHMS	WATT	HOFFMAN PART No.	IRC PART No.	NOTES
R60	560Ω	1		BTA-560	
R61	1000Ω	3		BTB-1000	
R62	33Ω	3		BTB-33	
R63	470KΩ	1	4622	BTS-470K	
R64	4.7Meg	1	4544	BTS-4.7Meg	
R65	330KΩ	1	4677	BTS-330K	
R66	22000Ω 5%	1	24525	BTS-2200 5%	
R67	20000Ω 5%	1	24535	BTS-2000 5%	
R68	18000Ω 5%	1	24517	BTS-1800 5%	
R69	18000Ω 5%	1	24517	BTS-1800 5%	
R70	270Ω	1	4663	BTS-270	
R71A	22KΩ			BTS-22K	
B	5000Ω		≋9005	BTS-5000	
C	82000Ω			BTS-82000	
R72	4.7Meg	1	24659	BTS-4.7Meg	
R73	4.7Meg	1	24658	BTS-4.7Meg	
R74	1000Ω	1	4659	BTS-1000	
R75	1800Ω	1	24507	BTA-1800K	
R76	1.2Meg	1		BTS-1.2Meg	
R77	680KΩ	1	24571	BTA-680K	
R78	5000Ω	1	4629	BTS-5000	
R79	470Ω	4	4064	BTS-470	
R80	150KΩ	1	24597	BTA-150	

ITEM No.	RATING: OHMS	WATT	HOFFMAN PART No.	IRC PART No.	NOTES
R81	560Ω	1	4507	BTS-560	
R82	1000Ω	3	4507	BTS-1000	
R83	1000Ω	1	4659	BTS-1000	
R84	100KΩ	1	4571	BTS-100K	
R85	100KΩ	1	4571	BTS-100K	
R86	470KΩ	1	4622	BTS-470K	
R87	4.7Meg	1	4544	BTS-4.7Meg	
R88	10000Ω 5%	1	4610	BTS-1000 5%	
R89	5600Ω	1	4629	BTS-5600	
R90	1000Ω	1	4659	BTS-1000	
R91	120KΩ	1	4548	BTS-120K	
R92	82KΩ	1	24670	BTS-82K	
R93	5600Ω	1	4629	BTS-5600	
R94	470KΩ	1	4622	BTS-470K	
R95	10KΩ	3	4503	BTS-10K	
R96	470Ω	1	4664	BTS-470	
R97	2.2Ω	1	4735		
R98	22Ω	2	14529		
R99	1500Ω	20	4772		
R100	120Ω	20	4774		
R101	5.1Ω	5	4762		
R102	1000Ω	1		BTS-1000	
R103	18KΩ	1		BTS-18K	Note

† Items R59A, R59B, C62A, C62B, C62C are combined in one unit.
• Items R71A, R71B, R71C, C67A, C67B, C67C are combined in one unit.
Note. Not used in all models.

TRANSFORMER (POWER)

ITEM No.	RATING: PRI.	SEC. 1	SEC. 2	HOFFMAN PART No.	Stancor PART No	Merit PART No	Triad PART No	RCA TYPE No	Halldorson PART No	Thordorson PART No
T1	117VAC @1.96A	740VAC @1.2A	6.3VAC	5049-1		P-3079				26R13 ①
				5050 ①						
	SEC. 3	SEC. 4	SEC. 5							
	6.3VAC @.6A									

① Used in chassis 405-21
② Tape extra 6.3 volt windings.

TRANSFORMERS (SWEEP CIRCUITS)

ITEM No.	USE	HOFFMAN PART No.	Stancor PART No	Merit PART No	Triad PART No	RCA TYPE No	Halldorson PART No	Thordorson PART No.
T3	Horiz. Output Trans.	5154	A-8137 & WC-5 *	HV0-8 *	D-19 *	230T1 *	FBH1 *	
T3	Vert. Output Trans.	5157	A-8141	A-3038	A-104X	226T1	21808	26R54
T4A	Yoke-Horiz.(39MH) Vert. (36MH)	9759	DY-11A	MDF-73	Y-22-1	332D1	DF605	Y-8
T5	Width (3.5-17MH)	5464	WC-8	MWC-8①	WC-12②	312H1		WC-18①

① Enlarge mounting hole.
② Connect to cooled blue and red terminals.

*HORIZONTAL OUTPUT TRANSFORMER CONNECTION DATA

Use Original Width Coil Unless Replacement Type Is Listed

ORIGINAL TERMINAL CONNECTIONS	Stancor Replacement Connections	Merit Replacement Connections	Triad Replacement Connections	RCA Replacement Connections	Halldorson Replacement Connections	Thordorson Replacement Connections
9	7	9	9	9	9	9
8	4	8	7 & 8	8	8	8
7	7	7	7 & 8	7		7
5	See Note 3	5	4	5	5	5
4	3	4	7	4	4	4
3	1	3	3	3	3	3
1	1	1	1	1	1	1
Connect Width Coil Across	3 & 1	WC-5 Orange & Black term. 1 & 3	3 & 1	3 & 1	3 & 1	3 & 1
Special Notes →	2					

① Connect red and blue terminals of WC-5 between C87 (original terminal #5 connection) and chassis ground.
If AGC does not function properly reverse these connections.

TRANSFORMER (AUDIO OUTPUT)

ITEM No	IMPEDANCE: PRI.	SEC.	HOFFMAN PART No.	Stancor PART No	Merit PART No	Triad PART No	Halldorson PART No	Thordorson PART No	NOTES
T6	7.3K	3.4Ω	5104 ① 5193 ①						① Used in chassis 405-21

SPEAKER

ITEM No.	RATINGS: SIZE	FIELD	V. C. IMP.	HOFFMAN PART No.	JENSEN PART No.	QUAM PART No.	NOTES
SP1	6½ x 10½	PM	3.4Ω	H9079			

HOFFMAN MODELS 21B161, 21B331, 21B334, 21M160, 21M330, 21M333, 21P332 (Ch. 405-21, 406-21)

PARTS LIST AND DESCRIPTIONS (Continued)

COILS (RF-IF)

ITEM No.	USE	DC RES.		REPLACEMENT DATA				NOTES
		PRI.	SEC.	HOFFMAN PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L1	IF Trap	0Ω						Wound on 68MMF Cap.
L2	IF Trap	0Ω						Wound on 68MMF Cap.
L3	Ant. Coils	0Ω CT	0Ω					
L4	IF Trap	.8Ω						
L5	Fil. Choke	0Ω						
L6	Neutr. Coil	0Ω						
L7	RF, Mixer Grid & Osc. Coils	0Ω						
L8	Fil. Choke	0Ω						
L9	Feedback Coil	1.3Ω						
L10	RF Choke	0Ω						
L11	Conv. Plate	0Ω						
L12	1st. Video IF	.1Ω		5539	17-4531 †		6231 *	
L13	2nd. Video IF	0Ω	0Ω	5538	17-4531 ▲		6233 ♦	
L14	47.25MC Trap	0Ω		5440	20-1047			
L15	3rd. Video IF	0Ω	0Ω	5538	17-4531 ▲		6232 ♦	
L16	41.25MC Trap	0Ω		5438				
L17	4th. Video IF	0Ω	0Ω	5538	17-4531 ▲		6234	
L18	5th. Video IF	0Ω	0Ω	5538	17-4531 ▲		6234	
L19	Series Peaking Coil	4.6Ω		5545	19-3100	TV-181	4642	105 Microhenries, wound on 10Meg resistor
L20	Shunt Peaking Coil	15Ω		5340	19-3300 ■		4648 ■	350 Microhenries, Wound on 10Meg resistor
L21	Series Peaking Coil	14Ω		5547	19-3100 ▲	TV-181 ▲	4642 ▲	105 Microhenries, wound on 8.2KΩ resistor
L22	Shunt Peaking Coil	15Ω		5548	19-3180	TV-184	6154	210 microhenries, wound on 10Meg resistor
L23	4.5MC Trap	1.9Ω		5402	20-1004	TV-151	1470	
L24	Sound IF	1Ω		5454	17-3400	TV-151	1469	
L25	Ratio Det.	8.5Ω .	.6Ω CT	5443	17-1033	TV-110	1468	Tertiary winding -.2Ω
L26	Horiz. Osc.	65Ω		5447	19-1576	TV-163	6210	
L27	RF Choke	0Ω		5266	19-1003		4608	4 Microhenries

† Use one winding only, detune trap and drill mounting holes.
* Use one winding only.
▲ Detune trap and drill mounting holes.
▲ Parallel with 8.2KΩ resistor
♦ Detune trap
■ Parallel with 10Meg resistor

SELENIUM RECTIFIER

ITEM No.	RATING	REPLACEMENT DATA						NOTES
	CURRENT	HOFFMAN PART No.	FEDERAL PART No.	INTERNATIONAL PART No.	MALLORY PART No.	SARKES TARZIAN PART No.	SELETRON PART No.	
M1	.250ADC	9735	1236A	RS300SL	6S300	300	6Q4	
M2	.250ADC	9735	1236A	RS300SL	6S300	300	6Q4	

MISCELLANEOUS

ITEM No.	PART NAME	HOFFMAN PART No.	NOTES
M3	Dial Light	9505	Bayonet #44
M4	Tuner	9786	VHF
	Tuner	9814	VHF-UHF
M5	Switch	6043	Loud Speaker - earphone
M6	Centering Magnet	9722	
M7	Ion Trap	9702	

TROUBLE SHOOTING AIDS (cont)

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POWER

DEAD SET

If filaments fail to light, check AC interlock assembly. Check T1 and switch on volume control. If filaments light, check R101 resistor fuse, M1 and M2. Check B+ filter and decoupling network.

SMALL AND/OR DIM PICTURE

Check M1 and M2. Check B+ filter and decoupling network.

HIGH VOLTAGE

LOSS OF HIGH VOLTAGE

Check by substitution V17, V18, V19 and V20. Check waveform W16.

If Satisfactory	If Unsatisfactory
Check T2, T4A, C85, C5, C86, R98, R95, C84 and other associated components.	Check C83, L26, C80, C79, R90, R91, R89 and other associated components.

INSUFFICIENT HIGH VOLTAGE

Check by substitution V17, V18, V19 and V20. Check M1 and M2. Check T2, T4A, R95, C83, R101, R100 and other associated components.

BLOOMING

Check by substitution V18, V19 and V20. Check M1 and M2. Check R95, C83 and other associated components.

GENERAL

RASTER, SOUND, NO PICTURE

Follow procedure outlined under "Loss of Video".

RASTER, PICTURE, NO SOUND

Follow procedure outlined under "Weak or No Sound".

RASTER, NO SOUND, NO PICTURE

Check by substitution V1, V2, V3, V4, V5, V6, V7 and V8. Check video IF components.

NO RASTER, NO SOUND

Follow procedure outlined under "Dead Set".

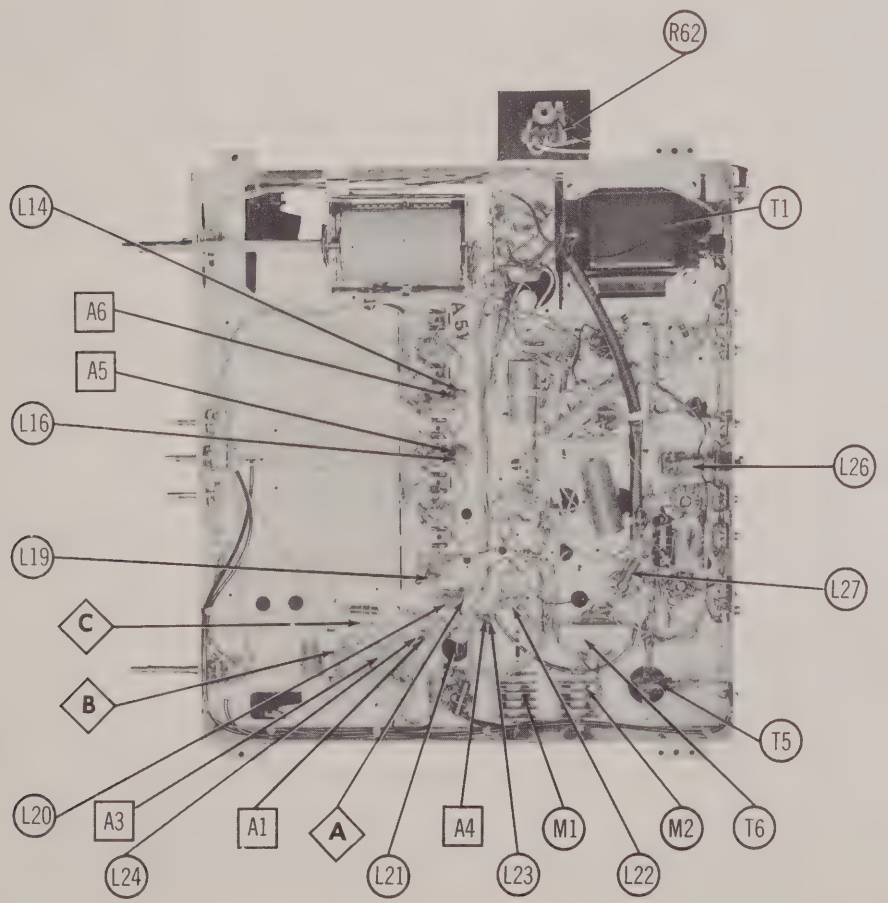
KEYSTONE EFFECT

Check T4 and its associated components.

INTERMITTENT STREAKS

Check high voltage section for corona discharge and arcing.

Symptoms shown are assumed and are not indicative of the quality and workmanship of this equipment.



CHASSIS BOTTOM VIEW-TRANS., INDUCTOR & ALIGN. IDENTIFICATION

SERVICING IN THE FIELD

TUNER OSCILLATOR ADJUSTMENTS

Touch-up adjustments of the VHF tuner oscillator circuit may be accomplished by removal of the channel selector and fine tuning knobs. The adjustments are accessible, one at a time, thru the small hole in the cabinet to the right of the channel selector shaft.

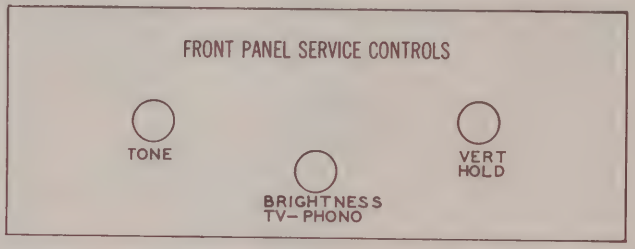
PICTURE TUBE SAFETY GLASS CLEANING

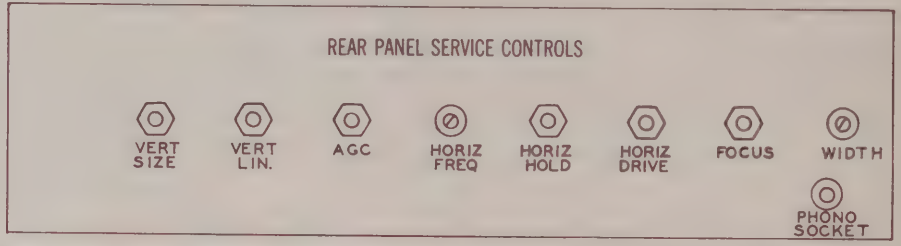
To clean safety glass remove 3 wood screws holding wood strip at the bottom of safety glass. Remove wood strip and safety glass. Use extreme caution when removing safety glass.

PICTURE TUBE REMOVAL

Remove safety glass and loosen two screws on the front tube mount. Remove CRT socket, Ion trap, centering magnet and HV lead. Remove picture tube from front of cabinet.

SERVICE ADJUSTMENT LOCATION





HORIZONTAL OSCILLATOR FIELD ADJUSTMENT

Adjustment of the horizontal oscillator circuit can be made from the rear panel of the chassis. Set the horizontal hold control at the mid-position of its range and adjust the horizontal frequency slug (L26) until the picture synchronizes horizontally.

SOUND IF DETECTOR BUZZ ADJUSTMENT

To eliminate sound IF detector buzz, adjust the ratio detector secondary (L25) located on top of chassis. (See tube placement chart).

CENTERING

Centering is accomplished mechanically by adjusting two magnetic rings around the neck of the picture tube, located flush against the deflection yoke. Rotate the two rings around the neck of the tube until the picture is properly centered.

DISASSEMBLY INSTRUCTIONS

1. Remove 4 push-on type control knobs from front panel.
2. Remove 7 wood screws and 1 metal screw. Remove rear cover.
3. Disconnect built-in antenna.
4. Disconnect speaker leads. Remove 4 speaker nuts. Remove speaker.
5. Some models use earphone jack. This may be removed by removing 4 bolts.
6. Remove 4 chassis bolts. Remove chassis.

NOTE: Under side of chassis may be serviced without removal of chassis from cabinet. Remove 1 wood screw and clamp from lower center of cabinet (rear) . Slide bottom cover out.

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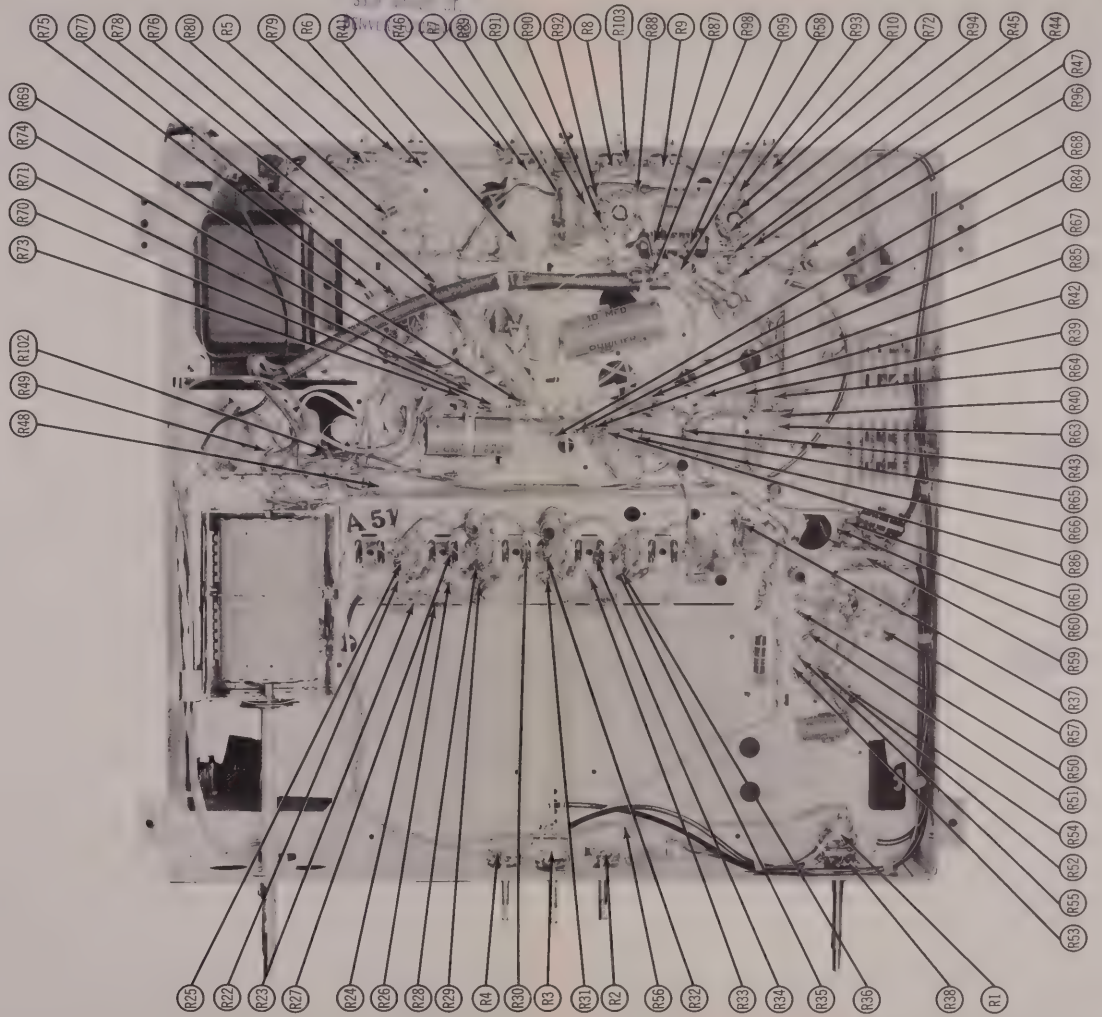

CHASSIS BOTTOM VIEW-RESISTOR IDENTIFICATION

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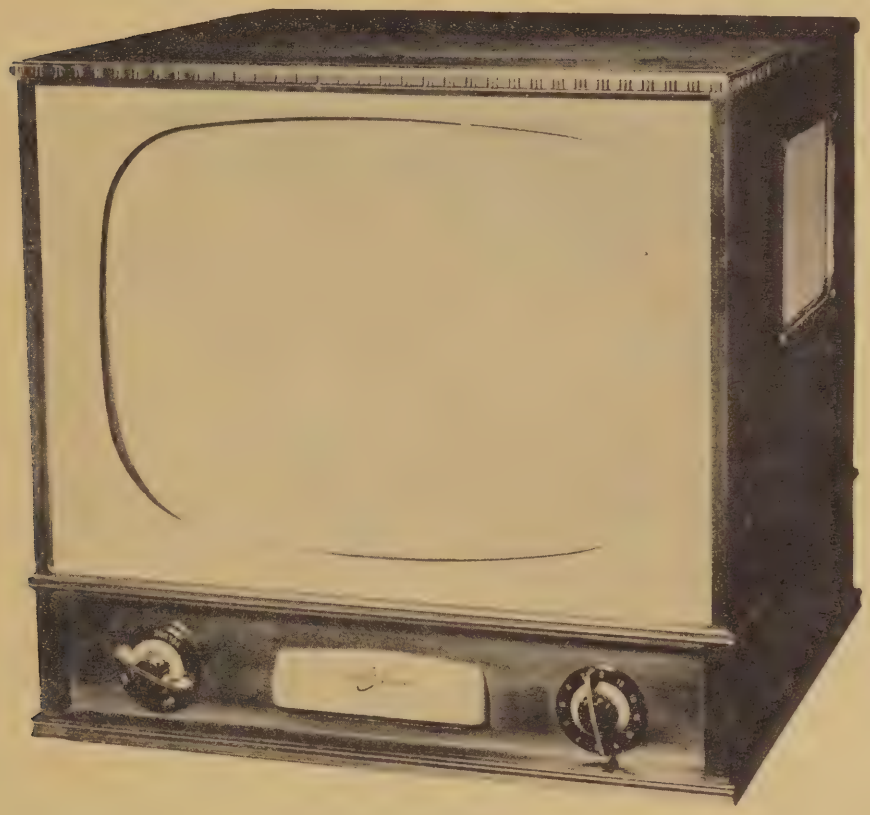
Merely insert the corresponding folder on this model in this envelope to retain proper filing and indexing order.



CHASSIS 9050

MIRRORTONE CHASSIS
9048, 9050, 9053, 9054

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PHOTOFACT* Folder
*TRADE MARK
RETMA MEMBER

MIRRORTONE CHASSIS 9048, 9050, 9053, 9054

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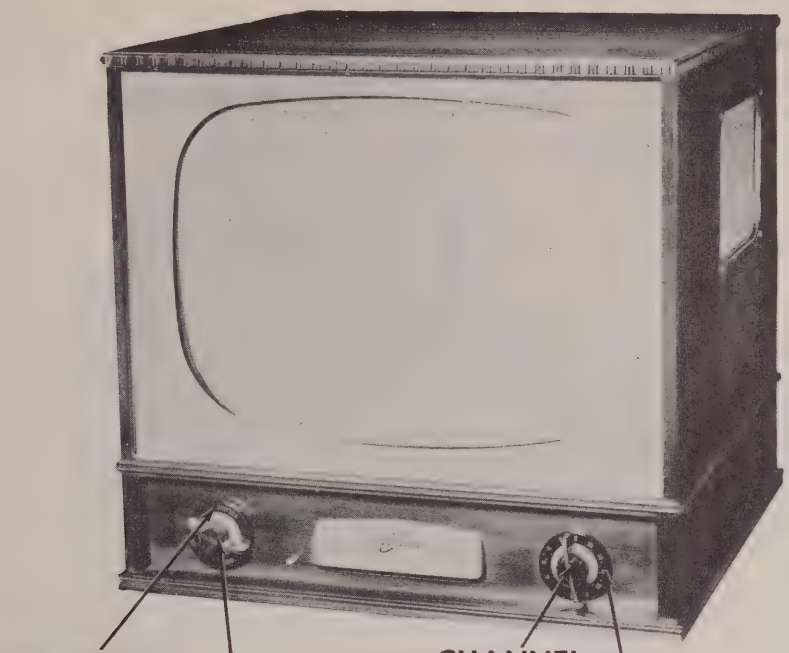

MIRRORTONE (Ch. 9050)

TRADE NAME	Mirrortone Ch. 9048, 9050, 9053, 9054 (Ch. 9053 and 9054 have no audio output stage)
MANUFACTURER	John Meck Industries, Plymouth, Indiana
TYPE SET	Television Receiver
TUBES	Twenty-one
POWER SUPPLY	110-120 Volts AC-60 Cycles RATING 1.84 Amp. @ 117 Volts AC
TUNING RANGE-	Channels 2 thru 13 VHF, 14 thru 83 UHF, Video IF 26.1MC, Sound IF 21.6MC (Intercarrier)

INDEX

Alignment Instructions 6, 7
Disassembly Instructions 18
Horizontal Sweep Circuit Adjustments 11
Parts List and Descriptions 14, 15, 16
Photographs
Cabinet- Rear View 11
Capacitor Identification 4, 9
Chassis-Top View 3
RF Tuner 10
Resistor Identification 19, 20
Photographs (Cont)
Trans., Inductor & Alignment Identification 16
Resistance Measurements 8
Servicing in the Field 18
Schematic (Alternate Tuner) 13
Schematic (TV) 2
Trouble Shooting Aids 12, 17
Tube Failure Check Chart 5
Tube Placement Chart (Bottom View) 8
Tube Placement Chart (Top View) 5

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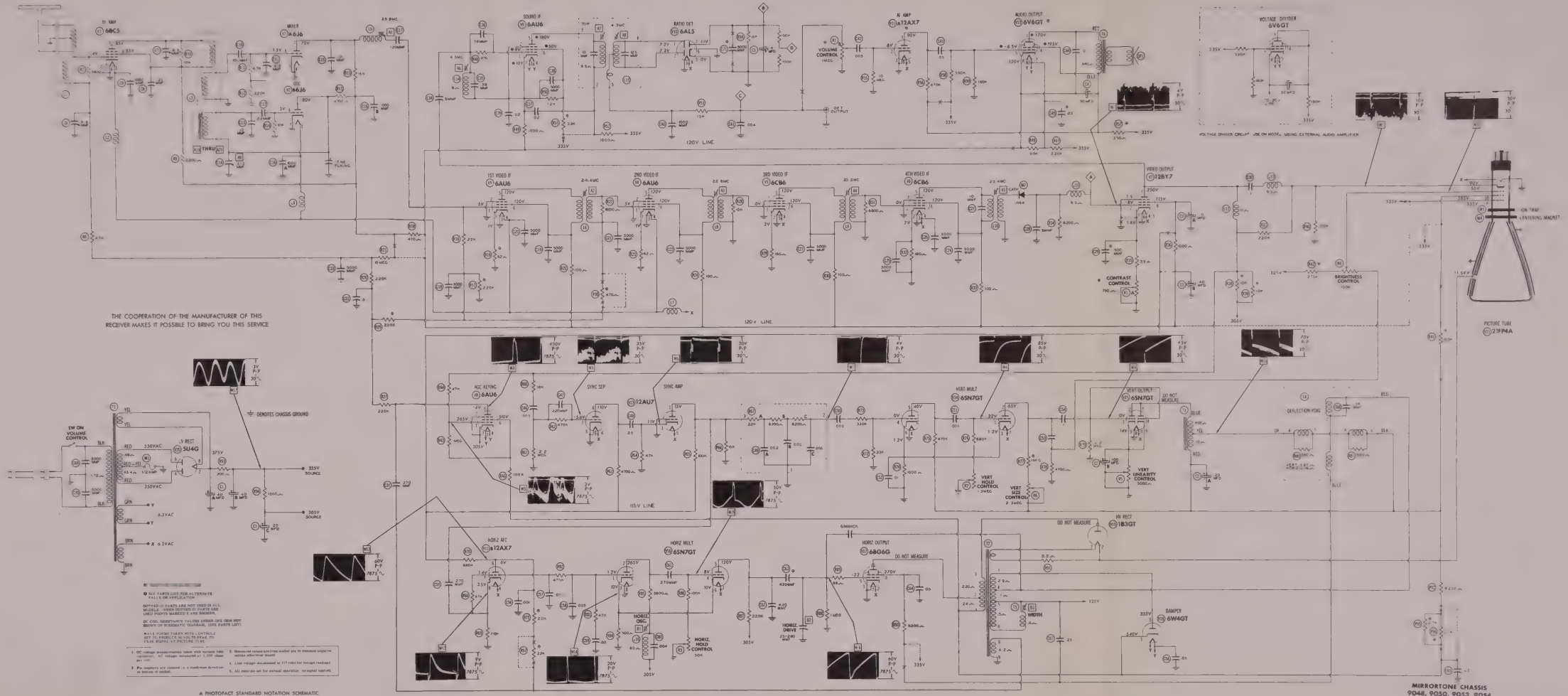
DATE 9-54 SET 250 FOLDER 14

MIRRORTONE CHASSIS
9048, 9050, 9053, 9054


THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE
DENOTES CHASSIS GROUND
SW ON VOLUME CONTROL
V RECT 5U4G
335V SOURCE
305V SOURCE
6.3VAC
350VAC
120V LINE
115V LINE
VOLUME CONTROL 1MEG
VOLTAGE DIVIDER 6V6GT
VOLTAGE DIVIDER CIRCUIT USE ON MODEL USING EXTERNAL AUDIO AMPLIFIER
CONTRAST CONTROL 750
BRIGHTNESS CONTROL 100K
ION TRAP (FINISHING MAGNET)
PICTURE TUBE 21FP4A
DEFLECTION YOKE
VERT LINEARITY CONTROL 5000
VERT SIZE CONTROL 2.5MEG
VERT HOLD CONTROL 1MEG
HORIZ. HOLD CONTROL 50K
HORIZ. OSC.
HORIZ. DRIVE 22-25K
WIDTH
DAMPER 6W4GT
HV RECT 1B3GT
DO NOT MEASURE
1ST VIDEO IF 6AU6
2ND VIDEO IF 6AU6
3RD VIDEO IF 6CB6
4TH VIDEO IF 6CB6
SOUND IF 6AU6
RATIO DET 6AL5
AI AMP 12AX7
AUDIO OUTPUT 6V6GT
VIDEO OUTPUT 12BY7
AGC KEYING 6AU6
SYNC SEP
SYNC AMP 12AU7
VERT MULT 6SN7GT
VERT OUTPUT 6SN7GT
HORIZ AFC 12AX7
HORIZ MULT 6SN7GT
HORIZ OUTPUT 6BG6G
DET 6AL5
MULT 6AJ6
OSC 6BJ6
RF AMP 6BC5
THRU
FINE TUNING
SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION
DOTTED IN PARTS ARE NOT USED IN ALL MODELS. WHEN DOTTED IN PARTS ARE USED POINTS MARKED X ARE BROKEN.
DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM. (SEE PARTS LIST)
WAVE FORMS TAKEN WITH CONTROLS SET TO PRODUCE A 10 VOLT PEAK TO PEAK SIGNAL AT PICTURE TUBE
A PHOTOFACT STANDARD NOTATION SCHEMATIC
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MIRRORTONE CHASSIS 9048, 9050, 9053, 9054

MIRRORTONE
CHASSIS 9048, 9050, 9053, 9054

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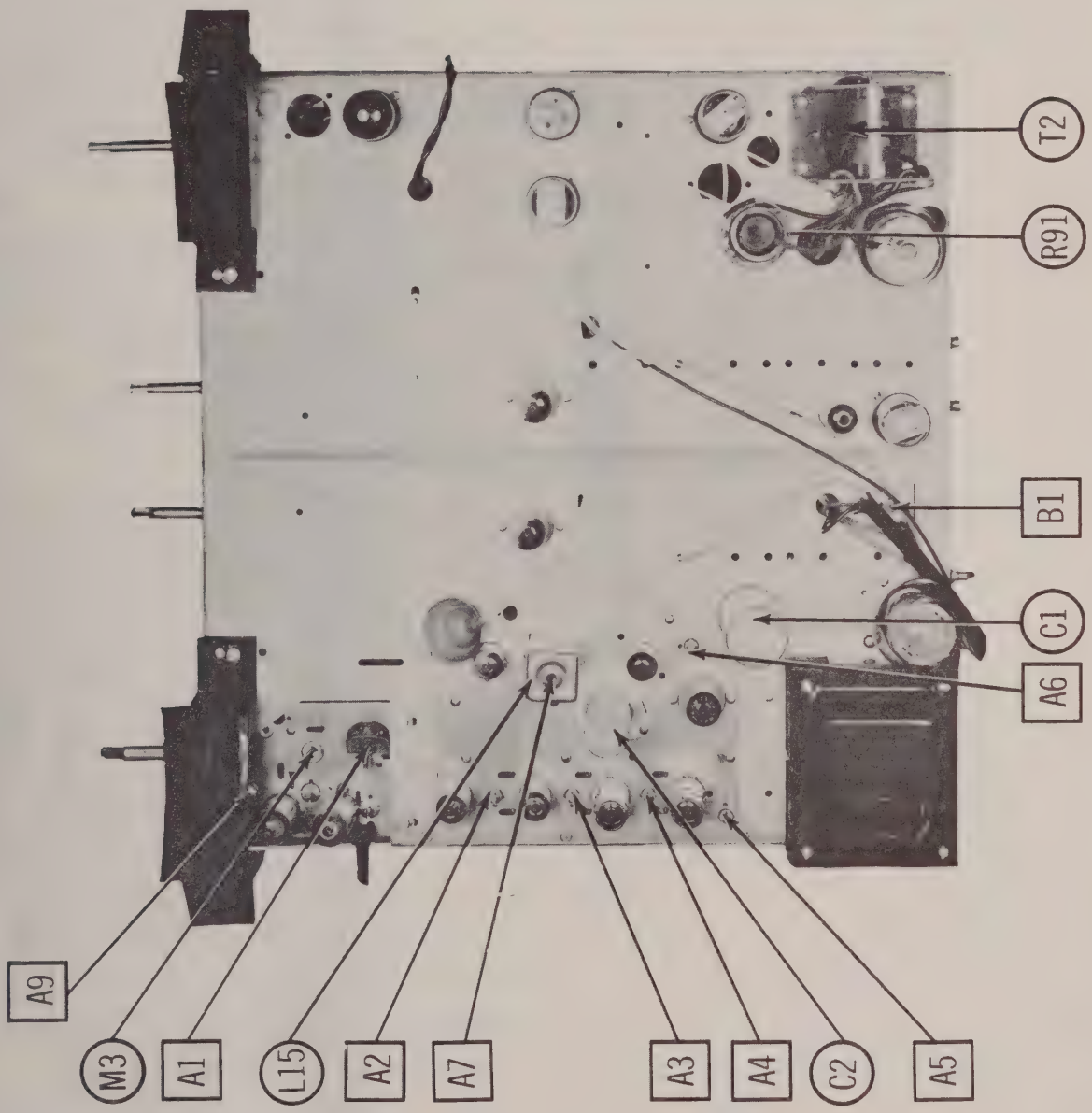
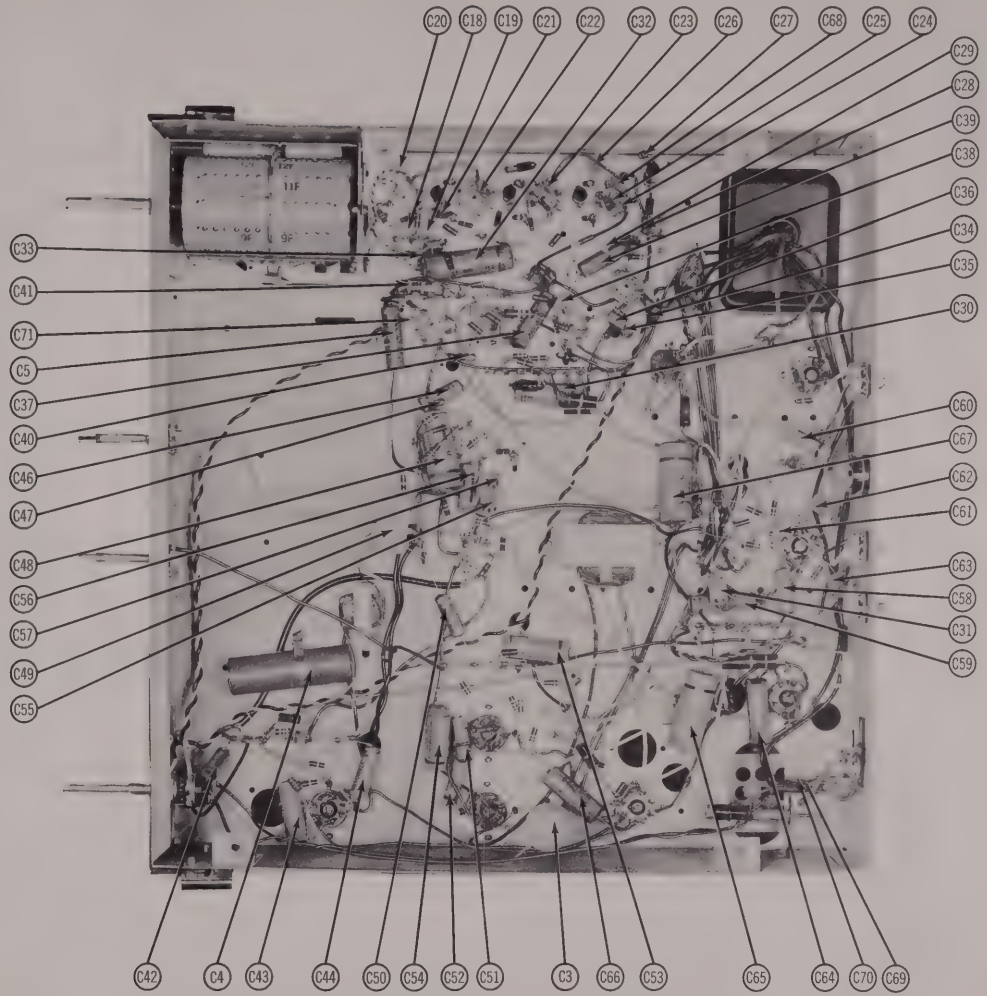


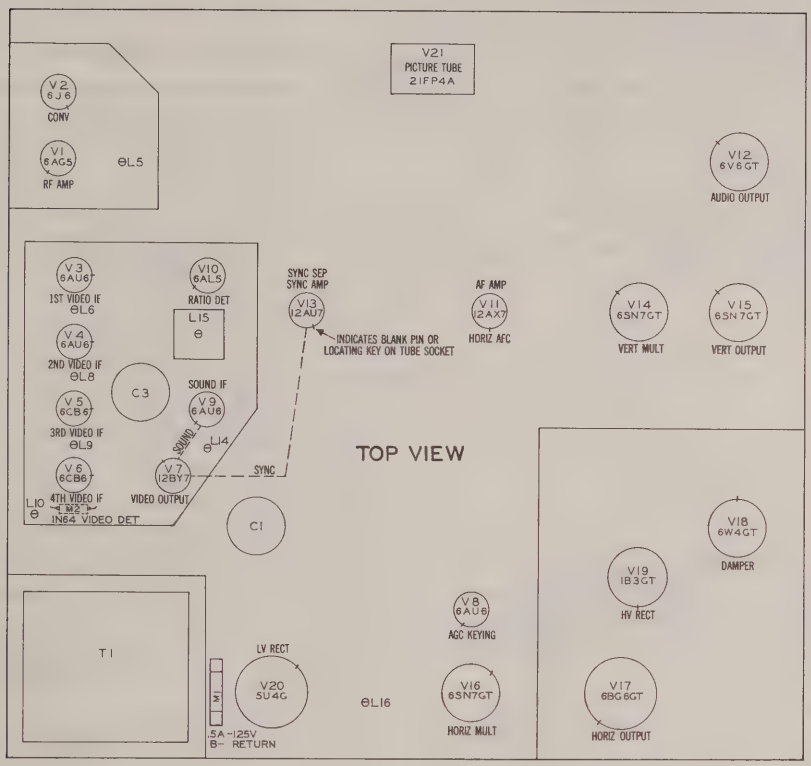
CHASSIS TOP VIEW

MIRRORTONE
CHASSIS 9048, 9050, 9053, 9054



CHASSIS BOTTOM VIEW-CAPACITOR IDENTIFICATION

TUBE PLACEMENT CHART



TUBE FAILURE CHECK CHART

The following chart lists tubes whose failures are most likely to produce the indicated symptoms. Refer to tube placement chart for location and type of tube.

POWER SUPPLY FAILURE
No raster, no sound - V20, Fuse (M1)

LOSS OF PICTURE OR SOUND
No pic, no sound, has raster - V2, V3, V4, V5, V6, V7, V12
No pic, no sound, has snow - V1, V2, V3
No pic, has sound, has raster - V7, V21
Has pic, no sound - V9, V10, V11, V12
Overloaded picture - V8

SYNC FAILURE
No vert. sync - V13, V14
No horiz. sync - V11, V13, V16
No vert. or horiz. sync - V13

SWEEP FAILURE
No raster, has sound - V16, V17, V18, V19
No vertical deflection - V14, V15
Poor vert. linearity or foldover - V14, V15
Poor horiz. linearity or foldover - V16, V17, V18
Narrow picture - V16, V17, V18, V19, V20
Vert. off freq. - V13, V14
Horiz. off freq. - V11, V13, V16

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

The high voltage lead should be securely taped and kept away from the chassis.
Do not remove the horizontal multivibrator tube (V16) to disable the high voltage.
Individual receivers may employ one of two variations in the video IF strip.
The first may be identified by the values of the grid load resistors of the last two IF amplifier tubes (R28 and R31) both being 6800Ω.
Alignment frequencies for this variation will be indicated in the tables by an asterisk (*).
In the other variation R28 is 10KΩ while R31 remains 6800Ω. Alignment frequencies for this second variation will appear in the tables unmarked.

VIDEO IF ALIGNMENT

Remove the converter tube (V2) from its socket and replace with a 6J6 which has pin 1 removed. This will disable the local oscillator and reduce the possibility of erroneous indications.
Connect the negative lead of a 3 volt battery to the ungrounded side of C32.
Connect the positive lead to chassis.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
1.	Direct	High side to an ungrounded tube shield floating over dummy converter tube. Low side to chassis.	25.8MC *25.9MC (Unmod)	Any	DC probe thru 1Meg to point (A). Common to chassis.	A1	Adjust for maximum deflection. Attenuate generator output to maintain 1 volt at VTVM.
2.	"	"	24.4MC *24.3MC	"	"	A2	"
3.	"	"	22.8MC *23.1MC	"	"	A3	"
4.	"	"	23.2MC *22.9MC	"	"	A4	"
5.	"	"	25.4MC *25.7MC	"	"	A5	"

OVERALL VIDEO IF RESPONSE CHECK

Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
6.	Direct	High side to an ungrounded tube shield floating over dummy converter tube. Low side to chassis.	24MC (10MC Swp)	21.6MC 22.7MC 26.1MC	Any	Vert. Amp. thru 100KΩ to point (A). Low side to chassis		Check for response similar to Fig. 1. If necessary, retouch A1 thru A5 to obtain desired response.

SOUND IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

Connect two matched 100KΩ (±1%) resistors in series from point (B) to chassis. The junction of these two resistors is alignment point (D) as shown on the schematic.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
7.	.01MFD	High side to point (A). Low side to chassis.	4.5MC (Unmod)	Any	DC probe to point (B). Common to chassis.	A6, A7	Adjust for maximum deflection. Attenuate generator output to maintain 5 volts on VTVM.
8.	"	"	"	"	DC probe to point (C). Common to point (D).	A8	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting. NOTE: Check part number on L15. If part number is TS-10062, then A8 is bottom core adjustment for other part numbers stamped on L15, A8 will be the top core adjustment.

SOUND IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use frequency modulated signal with 60% modulation and 450KC sweep. Use 120% sawtooth voltage in scope for horizontal deflection.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
7.	.01MFD	High side to point (A). Low side to chassis.	4.5MC (450KC Swp)	4.5MC	Any	Vert. Amp. to point (B). Low side to chassis.	A6, A7	Disconnect stabilizing capacitor C5. Adjust for curve of maximum amplitude and symmetry similar to Fig. 2.
8.	"	"	"	"	"	Vert. Amp. to point (C). Low side to chassis.	A8	Reconnect stabilizing capacitor C5. Adjust so that 4.5MC occurs at center of crossover lines as in Fig. 3. SLIGHTLY retouch A7 for maximum amplitude and straightness of crossover lines.

ALIGNMENT INSTRUCTIONS (cont)

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OSCILLATOR ALIGNMENT

Remove the dummy converter tube and replace the original 6J6 in its socket. Leave the bias battery connected as under "Video IF Alignment".
Complete oscillator alignment may not be necessary. If the oscillator seems to be off frequency approximately the same amount for a majority of the channels it may be possible to correct them in one step using A9.
It should be noted that this is an all channel oscillator circuit adjustment and should not be used to correct for any individual channel.
If adjustment of A9 will not bring all channels well within the range of the fine tuning control it will be necessary to adjust the channel strip adjustment for each channel that is off frequency. The channel oscillator screws are reached thru a hole just to the right of the channel switch shaft.
The correct adjustment screw is accessible thru this hole as the channel switch is turned to each channel.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Set the fine tuning control to the mid-position of its range.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
9.	Two 120Ω Carbon Resistors	Across antenna terminals with 120Ω in each lead.	213MC (10MC Swp)	211.25MC 215.75MC	13	Vert. Amp. thru 100KΩ to point (A). Low side to chassis.	A10	Adjust to place video marker at 50% as in Fig. 4. Sound marker should be no higher than 5% on response curve.
			207MC (10MC Swp)	205.25MC 209.75MC	12		A11	
			201MC (10MC Swp)	199.25MC 203.75MC	11		A12	
			195MC (10MC Swp)	193.25MC 197.75MC	10		A13	
			189MC (10MC Swp)	187.25MC 191.75MC	9		A14	
			183MC (10MC Swp)	181.25MC 185.75MC	8		A15	
			177MC (10MC Swp)	175.25MC 179.75MC	7		A16	
			85MC (10MC Swp)	83.25MC 87.75MC	6		A17	
			79MC (10MC Swp)	77.25MC 81.75MC	5		A18	
			69MC (10MC Swp)	67.25MC 71.75MC	4		A19	
			63MC (10MC Swp)	61.25MC 65.75MC	3		A20	
			57MC (10MC Swp)	55.25MC 59.75MC	2		A21	

RF AND MIXER ALIGNMENT

The RF and mixer portion of this receiver is very stable and has been properly aligned at the factory. Alignment of this portion should not be required in the field.

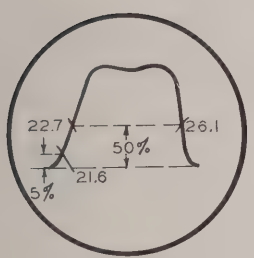


FIG.1

FIG.2

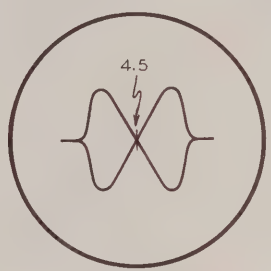


FIG.3

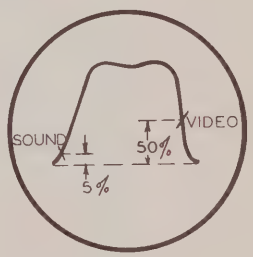
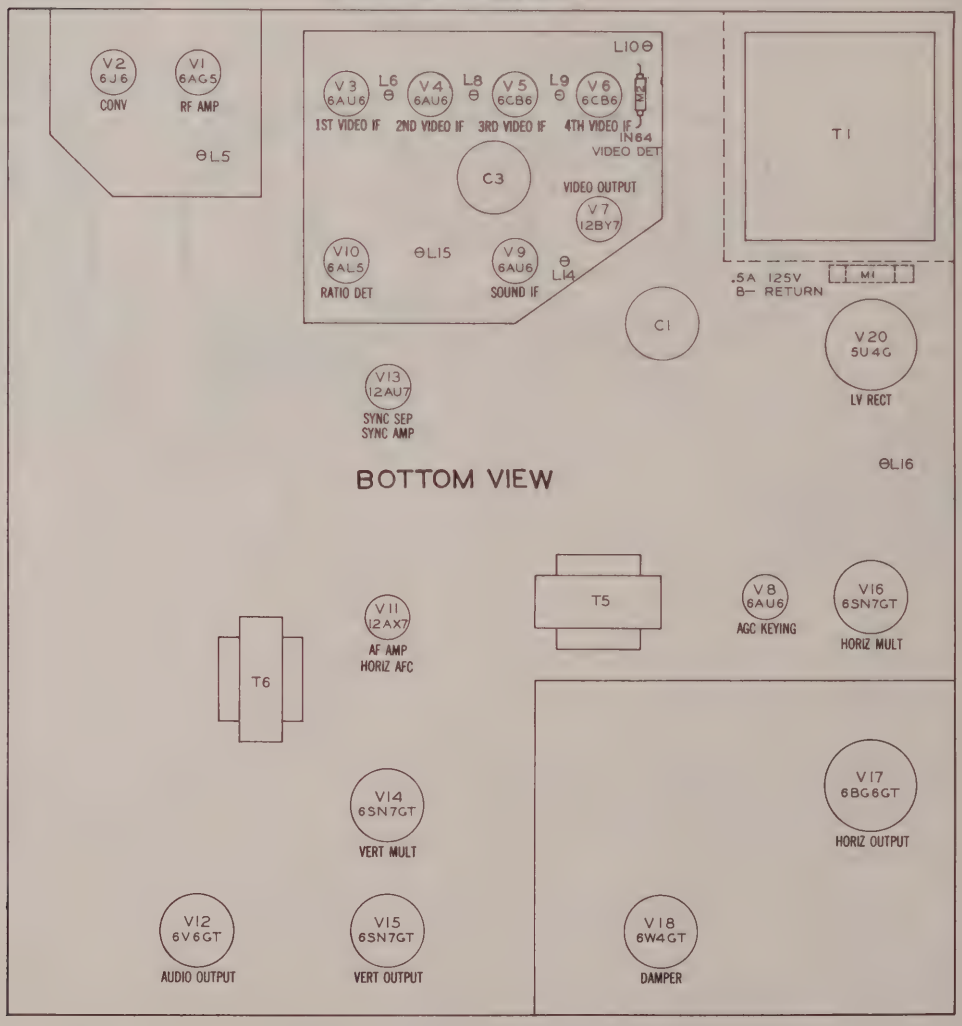


FIG. 4

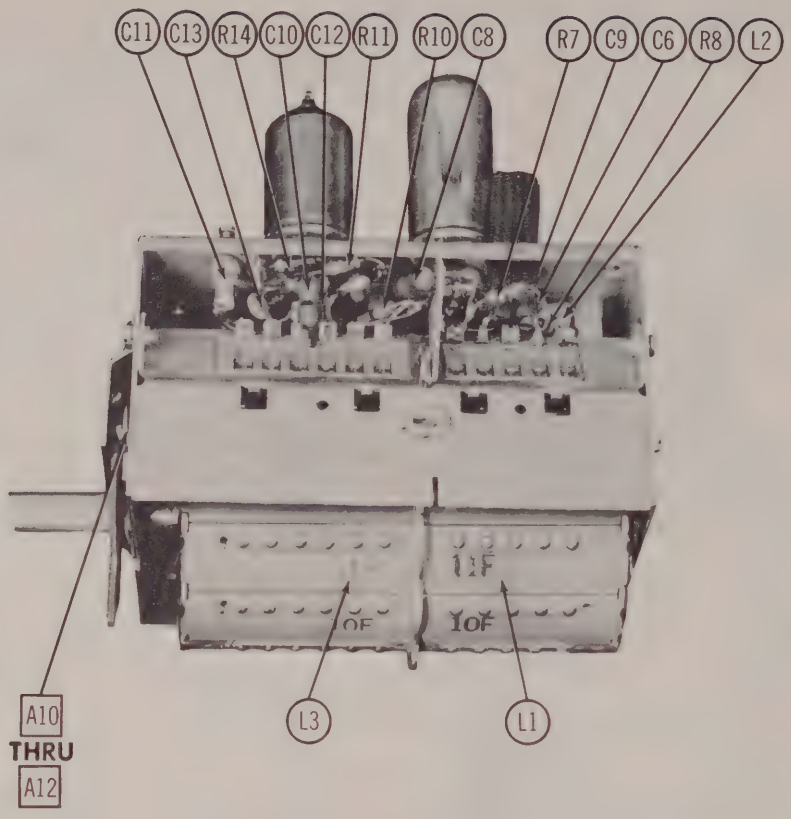
RESISTANCE MEASUREMENTS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	6BC5	660KΩ	0Ω	.1Ω	0Ω	† 2.7KΩ	†2.7KΩ	0Ω		
V 2	6J6	†5.2KΩ	†15.5KΩ	.1Ω	0Ω	225KΩ	10KΩ	0Ω		
V 3	6AU6	240KΩ	0Ω	0Ω	.1Ω	†100Ω	†100Ω	82Ω		
V 4	6AU6	220KΩ	0Ω	0Ω	.1Ω	†100Ω	†100Ω	82Ω		
V 5	6CB6	.1Ω	180Ω	0Ω	.1Ω	†100Ω	†100Ω	0Ω		
V 6	6CB6	.1Ω	180Ω	0Ω	.1Ω	†100Ω	†100Ω	0Ω		
V 7	12BY7	140Ω	8.2KΩ	0Ω	.1Ω	.1Ω	0Ω	■6.7KΩ	†1KΩ	0Ω
V 8	6AU6	■54KΩ	■1.7KΩ	■100KΩ	■100KΩ	660KΩ	▲100KΩ	■1.7KΩ		
V 9	6AU6	†48KΩ	†1KΩ	■100KΩ	■100KΩ	■1.2KΩ	■28KΩ	†1KΩ		
V 10	6AL5	1Meg	1Meg	0Ω	.1Ω	0Ω	INF	15KΩ		
V 11	12AX7	■470KΩ	10Meg	0Ω	.1Ω	.1Ω	44KΩ	14.7KΩ	100KΩ	0Ω
V 12	6V6GT	INF	■100KΩ	■1KΩ	■530Ω	120KΩ	INF	■100KΩ	60KΩ	
V 13	12AU7	†15KΩ	0Ω	47KΩ	.1Ω	.1Ω	†4.7KΩ	2.7Meg	0Ω	0Ω
V 14	6SN7GT	1.3Meg	▲2.3Meg	1KΩ	33KΩ	▲690KΩ	1KΩ	.1Ω	0Ω	
V 15	6SN7GT	2.2Meg	▲10.7KΩ	1KΩ	2.2Meg	▲10.7KΩ	1KΩ	.1Ω	0Ω	
V 16	6SN7GT	620KΩ	■7.4KΩ	1.5KΩ	130KΩ	■220KΩ	1.5KΩ	.1Ω	0Ω	
V 17	6BG6G	4.2Ω	.1Ω	0Ω	44KΩ	1Meg	INF	0Ω	■10KΩ	TOP CAP ▲24Ω
V 18	6W4GT	▲1.3KΩ	INF	1Meg	INF	■210Ω	INF	■100KΩ	■100KΩ	
V 19	1B3GT		PINS	1 - 8	HAVE	INF	RESISTANCE			TOP CAP ▲244Ω
V 20	5U4G	▲110KΩ	50KΩ	INF	45Ω	INF	50Ω	▲9.5KΩ	50KΩ	
V 21	21FP4A	0Ω	■100KΩ	PIN 6 ■200Ω	PIN 10 ▲110KΩ	PIN 11 ■80KΩ	PIN 12 .1Ω			

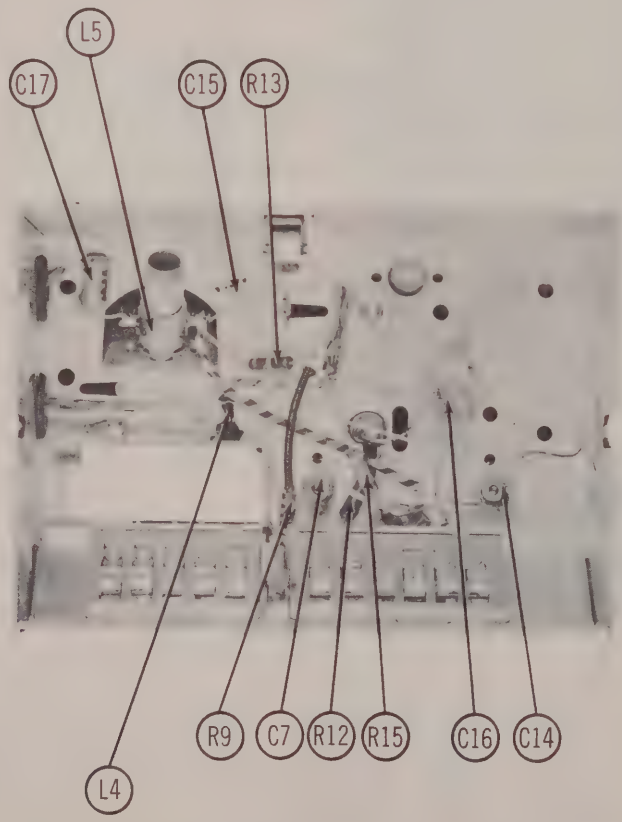
† MEASURED FROM 120 VOLT LINE
■ MEASURED FROM PIN 2 OF V20
▲ MEASURED FROM PIN 3 OF V18



TUBE PLACEMENT CHART

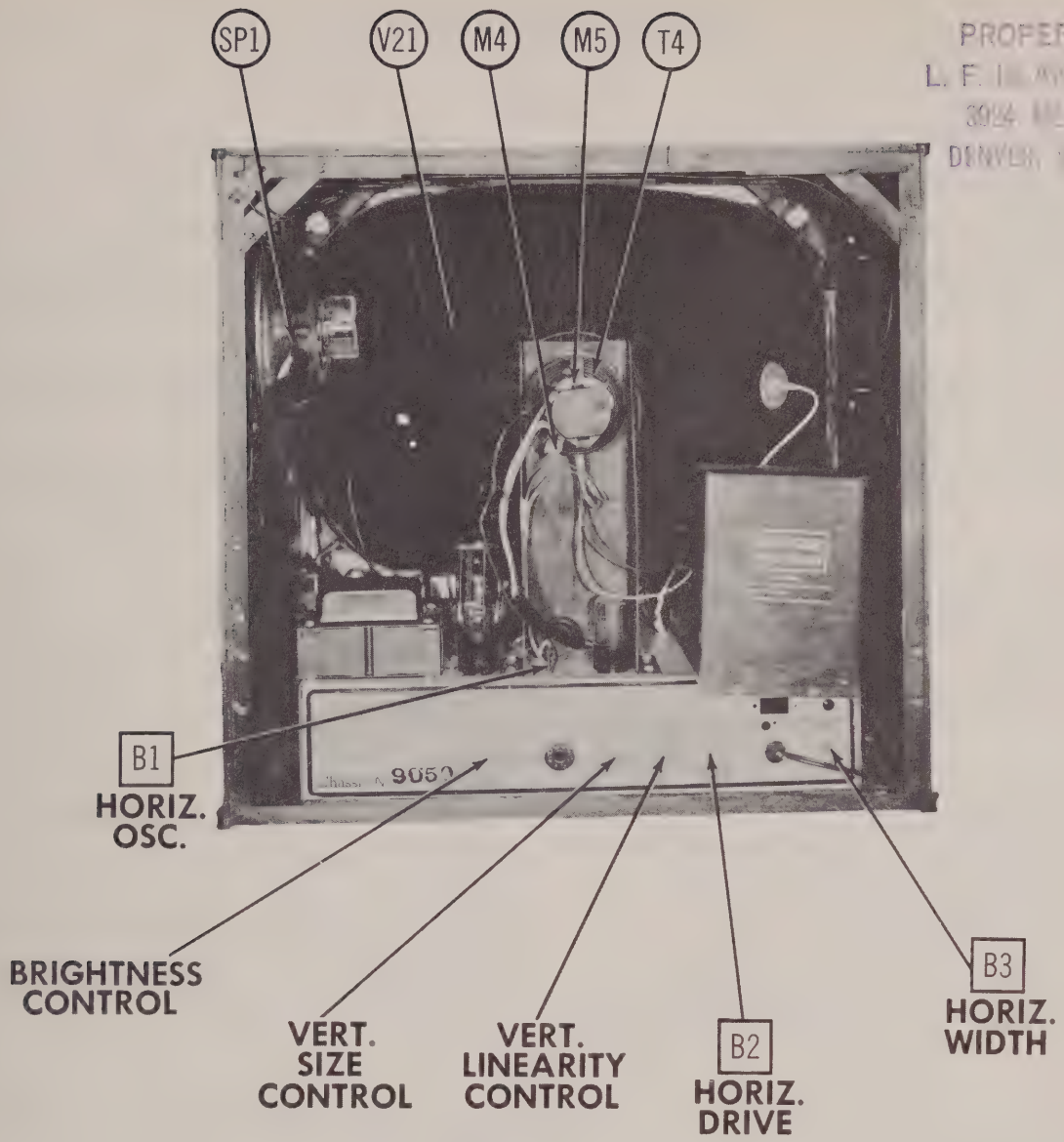


RF TUNER-RIGHT SIDE



RF TUNER-BOTTOM VIEW

PROPERTY OF
L. F. [illegible]
3924 [illegible] ST.
DENVER, [illegible]



CABINET—REAR VIEW

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

Turn the set on and tune in a TV station, preferably a test pattern.

Set the horizontal hold control to its mid-range position and adjust the horizontal oscillator slug (B1) until the picture synchronizes horizontally.

Adjust the horizontal drive trimmer (B2) counter clockwise as far as possible without the presence of vertical white lines ore compression near the center of the picture.

Adjust the width slug (B3) for a picture SLIGHTLY wider than necessary to fill the picture mask horizontally.

TROUBLE SHOOTING AIDS

SWEEP

HORIZONTAL

LOSS OF SWEEP

Follow procedure outlined under "Loss of High Voltage".

INSUFFICIENT SWEEP

Check by substitution V16, V17, V18 and V20. Adjust B2 and B3. Check T2, T4A, R90 and other associated components.

DRIVE LINES

Check by substitution V16, V17 and V18. Adjust B2. Check T2, T4A, C63, C62 and other associated components.

COMPRESSED LEFT SIDE

Check by substitution V17 and V18. Adjust B2 and B3. Check horizontal output and damper stages for component failure or change of value.

FOLDS

Follow procedure outlined under "Drive Lines".

PIE CRUST EFFECT

Check by substitution V16, V17 and V18. Check C58 for open. Check L16, C60 and other associated components.

XMAS TREE EFFECT

Check by substitution V16, V17 and V18. Check L16, C60, C62, C61, R90, and R89. Check T2 and T4A for internal arcing.

VERTICAL

LOSS OF SWEEP

Check by substitution V14 and V15. Check waveform W9.

If Satisfactory	If Unsatisfactory
Check T3, T4B, C2A and other associated components.	Check C54, C51, R6, R77, R75 and other associated components.

INSUFFICIENT SWEEP

Check by substitution V14 and V15. Check vertical size and vertical linearity controls for proper operation. Check C2B, T4B, T3 and other associated components.

COMPRESSED AT BOTTOM

Check by substitution V14 and V15. Check R6, R77 and other associated components.

COMPRESSED AT TOP

Check by substitution V14 and V15. Check R5, R79, C2B and other associated components.

FOLDS

Check by substitution V14 and V15. Check C53, R78 and other associated components.

SYNC

LOSS OF VERTICAL AND HORIZONTAL SYNC

Check by substitution V13 and V11. Check C46, C47, C48, R63, R65 and other associated components.

LOSS OF VERTICAL SYNC-HORIZONTAL SYNC SATISFACTORY

Substitute V14. Check waveform W7.

If Satisfactory	If Unsatisfactory
Check R75, R2, C52 and other associated components.	Check C50. Check the vertical integrator network for component failure or change of value.

LOSS OF HORIZONTAL SYNC-VERTICAL SYNC SATISFACTORY

Check by substitution V11 and V16. Check waveform W14.

If Unsatisfactory	If Satisfactory
Check C61, C59, C60, R86, R85, R3 and other associated components.	Check C58, C55, C56, R70, R69, R82 and other associated components.

HORIZONTAL BENDING

Check by substitution V8, V11, V13 and V16. Check horizontal AFC" network for component failure or change of value.

VIDEO

LOSS OF VIDEO

Check L13, C30, R40, R37, Check video detector network and other associated components.

SOUND BARS (4.5MC BEAT)

Adjust tuner fine tuning for best sound and picture. Check video IF alignment.

POOR CONTRAST

Check by substitution V3, V4, V5, V6 and V7. Check video detector network, picture tube and other associated components.

NEGATIVE PICTURE

Substitute V7. Check video detector network, picture tube. Check AGC network.

SMEAR

Substitute V7. Check L11, L12, L13, C30 and other associated components.

WIDE BLACK BAR ACROSS PICTURE

Check by substitution V3, V4, V5, V6 and V7 for heater to cathode leakage.

AUDIO

WEAK OR NO SOUND

Check by substitution V9, V10, V11 and V12. Check audio stages V11 and V12 using audio signal generator. Apply audio signal across R18.

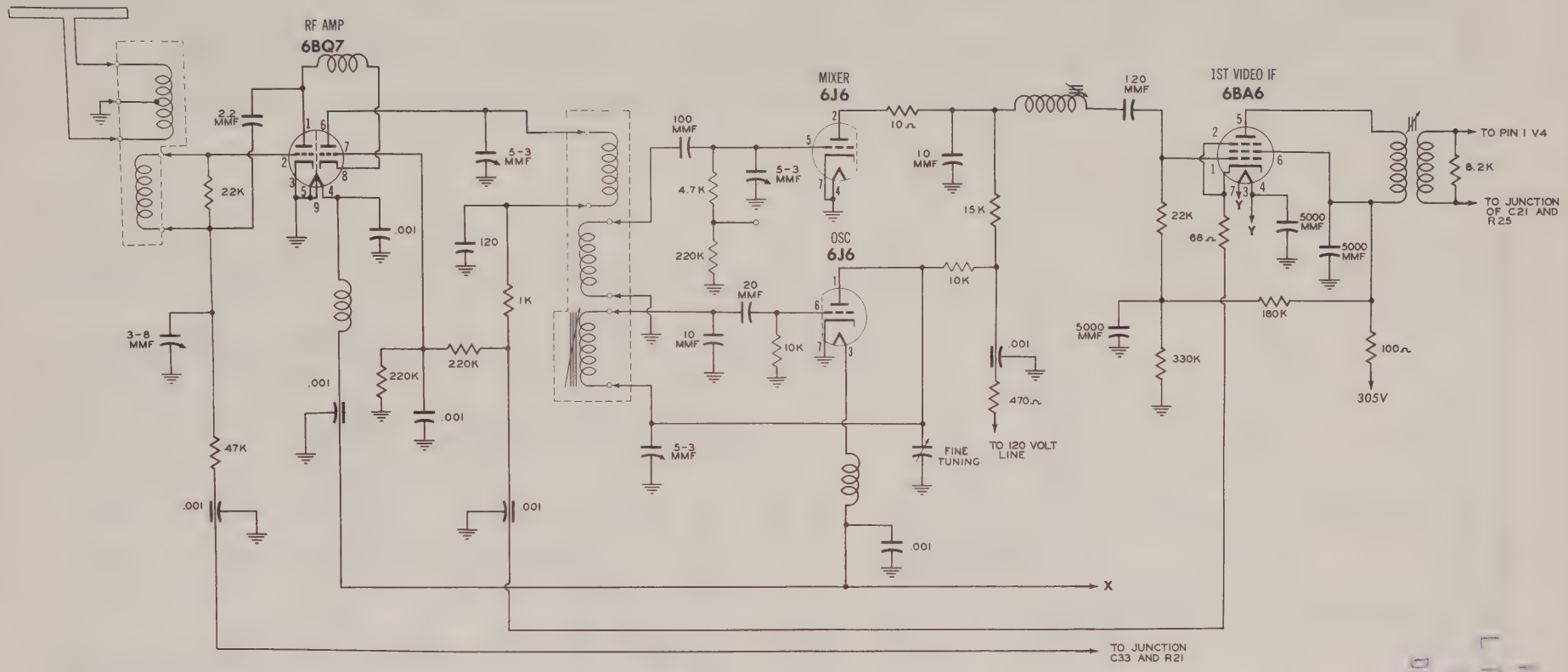
If Satisfactory	If Unsatisfactory
Check ratio detector and audio IF stages for component failure or change of value.	Check C42, C43, C44, C4, R47, R45, R56, R58, T6, speaker and other associated components.

BUZZ

Adjust tuner fine tuning for best sound and picture. Check adjustment A8 for minimum buzz. Check C5, if still unsatisfactory. Check audio IF alignment.

DISTORTED

Follow procedure outlined under "Weak or No Sound".



A PHOTOFACT STANDARD NOTATION SCHEMATIC

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ALTERNATE VHF TUNER USED IN SOME MODELS

DENVER, COLORADO

PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST.

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No	USE	REPLACEMENT DATA: Mirrortone Part No.	STANDARD REPLACEMENT	RETMA BASE TYPE	NOTES
V1	RF Amplifier	6BC5	6BC5	TBD	
V2	RF Amplifier	6AG5	6AG5	TBD	Alternate
V3	Converter	6J6	6J6	TBF	
V3	1st. Video IF Amp.	6AU6	6AU6	TBK	
V4	2nd. Video IF Amp.	6AU6	6AU6	TBK	
V5	3rd. Video IF Amp.	6CB6	6CB6	TCM	
V6	4th. Video IF Amp.	6CB6	6CB6	TCM	
V7	Video Output	12BY7	12BY7	9BF	
V8	AGC Keying	6AU6	6AU6	TBK	
V9	Sound IF Amp.	6AU6	6AU6	TBK	
V10	Ratio Detector	6AL5	6AL5	5BT	
V11	AF Amplifier - Horiz. AFC	12AX7	12AX7	9A	In models without audio, pins 1, 2 and 3 are not used
V12	Audio Output	6V6GT	6V6GT	7E	In models without audio this tube is used as a voltage divider
V13	Sync Amp.-Sync Separator	12AU7	12AU7	9A	
V14	Vert. Mult.	6SN7GT	6SN7GT	9BD	
V15	Vert. Output	6SN7GT	6SN7GT	9BD	
V16	Horiz.Mult.	6SN7GT	6SN7GT	9BD	
V17	Horiz. Output	6BG6G	6BG6G	5BT	
V18	Damper	6W4GT	6W4GT	6CG	
V19	HV Rectifier	1B3GT	1B3GT	8C	
V20	LV Rectifier	5U4G	5U4G	5T	

CATHODE-RAY TUBE

ITEM No	REPLACEMENT DATA: Mirrortone Part No.	CBS-HYTRON Part No.	GENERAL ELECTRIC Part No.	SYLVANIA Part No.	WESTINGHOUSE Part No.	RETMA BASE TYPE	NOTES
V21	21FP4A	21FP4A	21FP4A	21FP4A 21FP4C 21FP4 ①	21FP4A	12L 12L 12M	① Circuit changes necessary

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	VOLT	Mirrortone Part No.	AEROVOX Part No.	CENTRALAB Part No.	CORNELL-DUBILIER Part No.	ERIE Part No.	MALLORY Part No.	SPRAGUE Part No.	NOTES
C1A	±40	450		AFH-79		C1S5		FP238	TVL-3788	
B	±40	450						TC75		
C	±20	450								
C2A	20	450		PR456/20		HR2045		TC75	TVA-1709	Red
B	100	25		PR325/100		HR3S1		TC2501	TVA-1307	Yellow
C3A	±10	350		AFH3-28		C0S2		FP350.9	TVL-3817	
B	±40	350								
C4	50	350		PR456/50		HR6035		TC68	TVA-1713	
C5	4	50		PR150/4		HR550		TC50	TVA-1303	
C6	3-6				829-10					
C7	.5-3				829-3		315-01-6R5	C7565A		
C8	135			SU20	D8-101	TP36	GP2K-121	UC-5313	5GA-T13	
C9	1006			BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C10	100			SU00	D8-101	TP34	GP1K-101	UC-531	5GA-T1	
C11	.5-3				829-3		315-01-6R5	C7565A		
C12	30			SU30NP0	TCZ-30	TZ15	NP0K-300	ZT-542	5TCC-Q3	
C13	10			SU00N150	TCN-10	N015	N150K-100	NT-541	5TCU-Q1	
C14	.5-3				829-3		315-01-6R5	C7565A		
C15	10			SU10NP0	TCZ-10	TZ06	NP0K-100	ZT-541	5TCC-Q1	
C16A	1000			BPD-2X001	DD2-102	S12-001	1000-S401	DCD-541	5HK-HD1	
B	1000									
C17	120			SU20	D8-121	TP35	GP2K-121	UC-5312	5GA-T12	
C18	5000			BPD-005	DD-502	K060	81L-005	DC-525	5HK-D5	
C19	5000			BPD-005	DD-502	K060	81L-005	DC-525	5HK-D5	
C20	5000			BPD-005	DD-502	K060	81L-005	DC-525	5HK-D5	
C21	5000			BPD-005	DD-502	K060	81L-005	DC-525	5HK-D5	
C22	5000			BPD-005	DD-502	K060	81L-005	DC-525	5HK-D5	
C23	5000			BPD-005	DD-502	K060	81L-005	DC-525	5HK-D5	
C24	5000			BPD-005	DD-502	K060	81L-005	DC-525	5HK-D5	
C25	5000			BPD-005	DD-502	K060	81L-005	DC-525	5HK-D5	
C26	5000			BPD-005	DD-502	K060	81L-005	DC-525	5HK-D5	
C27	10			SU10	D8-100	TP09	GP1K-100	UC-541	5GA-Q1	
C28	30			SUNNP0	TCZ-4,7	TZ07	NP0K-050	UC-555	5TCCB-V47	
C29	1500			SU1500	D8-152	TP54	GP2L-152	UC-5315	5HK-D15	Note 1
C30	.1	600		P088-1	DF-104	CUB6P1		PT601	6TM-P1	
C31	270	600		1468-0003	D8-271	5WST27	GP2K-271	MC241	1FM-33	
C32	.5	300		P288-5		CUB2P5		PT405	3TM-P5	
C33	5000			BPD-005	DD-502	K060	81L-005	DC-525	5HK-D5	
C34	5			SUNNP0	TCZ-4,7	TZ07	NP0K-050	ZT-555	5TCCB-V47	
C35	39	500		1468-00004	D8-390	5WS039	GP1K-390	MC323	1FM-44	
C36	39	500		1468-00004	D8-390	5WS039	GP1K-390	MC323	1FM-44	
C37	.02	600		P088-02	DF-203	CUB6S2	817-02	PT613	6TM-S3	
C38	5000			BPD-005	DD-502	K060	81L-005	DC-525	5HK-D5	
C39	.03	600		P088-02	DF-203	CUB6S2	817-02	PT613	6TM-S2	
C40	1000			SU000	D6-102	TP53	GP2L-102	UC-521	5HK-D1	
C41	.004	400		P088-004	D6-402	CUB5D4	GP2-333-S02	PT624	6TM-D4	
C42	.005	600		P088-005	D6-502	CUB6D5	GP2-333-502	PT625	6TM-D5	
C43	.05	600		P088-05	DF-503	CUB6S5		PT615	6TM-S5	
C44	.01	1000		P1088-001		CUB1GD1	1RS5KV-102	PT1621	MB-D1	
C45	.05	400		P488-05	DF-503	CUB6S5		PT615	6TM-S5	Note 2
C46	.005	600		P088-005	D6-502	CUB5D5	GP2-333-502	PT625	6TM-D5	
C47	220			SU220	D6-221	TP39	GP2K-221	UC-5322	5GA-T22	
C48	.25	600		684-25		CUB6P25		PT625	6TM-P25	
C49A	.002							PT622		
B	.005		±CMX-10013	4PA-110	4PC-100	4U57M1	4405-01	PT625	4V-1	
C	.005							PT625		
C50	.005	600		P088-005	D6-502	CUB6D5	GP2-333-502	PT625	6TM-D5	
C51	.005	600		P088-005	D6-502	CUB6D5	GP2-333-502	PT625	6TM-D5	
C52	.01	600		P088-01	D6-103	CUB6S1	GP2-333-103	PT611	6TM-S1	
C53	.1	600		P088-1	DF-104	CUB6P1		PT601	6TM-P1	
C54	.1	600		P088-1	DF-104	CUB6P1		PT601	6TM-P1	
C55	270	600		1468-0003		5WST27		MC8241	MS-23	
C56	.001	600		P088-001	D6-102	CUB6D1	GP2L-102	PT621	6TM-D1	
C57	.001	600		P088-001	D6-102	CUB6D1	GP2L-102	PT621	6TM-D1	
C58	.005	600		P088-005	D6-502	CUB6D5	GP2-333-502	PT625	6TM-D5	

PARTS LIST AND DESCRIPTIONS (cont)

CAPACITORS (cont)

ITEM No	RATING: CAP	VOLT	Mirrortone Part No.	AEROVOX Part No.	CENTRALAB Part No.	CORNELL-DUBILIER Part No.	ERIE Part No.	MALLORY Part No.	SPRAGUE Part No.	NOTES
C59	.05	600		P088-05	DF-503	CUB6S5		PT615	6TM-S5	
C60	.004	400		1464-004		CUB5D4		MCB463	MS-24	
C61	270	500				5WST27				
C62	430	500				5WST43				Note 3
C63	430	500				5WST43				
C64	.05	600		P088-05	DF-503	CUB6S5		PT615	6TM-S5	
C65	56	2000		684-25		CUB6P25		PT625	6TM-P25	
C66	5000			BPD-005	DD-502	K080	3KV-560 81L-005	DC-525	20GA-Q56 5HK-D5	
C67	5000			BPD-005	DD-502	K080	81L-005	DC-525	5HK-D5	
C68	5000			BPD-005	DD-502	K080	81L-005	DC-525	5HK-D5	Note 2
C69	5000			BPD-005	DD-502	K080	81L-005	DC-525	5HK-D5	

Note 1. Some models use 330MMF in this application.
Note 2. Not used in all models.
Note 3. Some models use 270MMF in this application.
* Items C49A, C49B, C49C, R87A, R87B, R87C are combined in one unit.

CONTROLS

ITEM No.	RATING: RESISTANCE	WATTS	Mirrortone Part No.	IRC Part No.	CLAROSTAT Part No.	CENTRALAB Part No.	MALLORY Part No.	INSTALLATION NOTES
R1A	750Ω	½	VCA12340	*QJ-521	RTV-645		UP75L-T52	Contrast-tapped @ 25?Ω- Panel - Note
B	1Meg						UR16-T354	Volume-tapped @ 250KΩ- Rear
C	Switch						US-25	Attach to R1B
R2A	1.2Meg	½	VC11232	Q11-128	A47-2Meg-S	AB-89	U-155	Vert. Hold
B	Shaft		Not Req.	Not Req.	KS6-3	AK-4	Not Req.	Attach to R2A
R3A	50KΩ	½	VC11231	Q11-123	A47-50K-S	AB-31	U-35	Horiz. Hold
B	Shaft		Not Req.	Not Req.	KS6-3	AK-4	Not Req.	Attach to R3A
R4A	100KΩ	½	VCA-12135	Q11-128	A47-100K-S	AB-40	SU-61	Brightness
B	Shaft		Not Req.	Not Req.	FK3-1/4	AK-1	Not Req.	Attach to R4A
R5A	5000Ω	½	VC11230	Q11-116	A47-5000-S	AB-10	SU-14	Vert. Linearity
B	Shaft		Not Req.	Not Req.	FK3-1/4	AK-1	Not Req.	Attach to R5A
R6A	2.5Meg	½	VC11231	Q11-239	A47-2.5Meg-S	AB-83	SU-565	Vert. Size
B	Shaft		Not Req.	Not Req.	KS6-3	AK-1	Not Req.	Attach to R6A

* CONCENTRIC ET EQUIVALENT KIT K-1 BASE ELEMENTS & SHAFTS B17-105X & P1-210 (Panel)
B13-137X & R3-225 (Rear) & SWITCH 76-1.

NOTE: Some models may use an alternate control part #VSA-10012

RESISTORS

ITEM No.	RATING: OHMS	WATT	Mirrortone Part No.	IRC Part No.	NOTES
R7	3900Ω	½		BTS-3900	
R8	47KΩ	½		BTS-47K	
R9	2200Ω	½		BTS-2200	
R10	10KΩ	½		BTS-10K	
R11	4700Ω	½		BTS-4700	
R12	220KΩ	½		BTS-220K	
R13	15KΩ	½		BTS-15K	
R14	10KΩ	½		BTS-10K	
R15	4700Ω	½		BTS-4700	
R16	22KΩ	½		BTS-22K	
R17	220KΩ	½		BTS-220K	Note 10
R18	470Ω	½		BTS-470	
R19	82Ω	½		BTS-82	Note 8
R20	100Ω	½		BTS-100	
R21	10Meg	½		BTS-10Meg	
R22	8200Ω	½		BTS-8200	
R23	82Ω	½		BTS-82	
R24	100Ω	½		BTS-100	
R25	220KΩ	½		BTS-220K	Note 7
R26	220KΩ	½		BTS-220K	
R27	330KΩ	½		BTS-330K	
R28	10KΩ	½		BTS-10K	
R29	180Ω	½		BTS-180	
R30	100Ω	½		BTS-100	
R31	6800Ω	½		BTS-6800	
R32	180Ω	½		BTS-180	
R33	100Ω	½		BTS-100	
R34	8200Ω	½		BTS-8200	
R35	33Ω	½		BTS-33	
R36	1000Ω	½		BTS-1000	
R37	270KΩ	½		BTS-270K	
R38	10KΩ	2			Note 1
R39	10KΩ	2			Note 1
R40	100KΩ	½		BTS-100K	
R41	100KΩ	½		BTS-100K	Note 2
R42	270KΩ	½		BTS-270K	Note 8
R43	1Meg	½		BTS-1Meg	
R44	47KΩ	½		BTS-47K	
R45	100KΩ	½		BTS-100K	
R46	100KΩ	½		BTS-100K	
R47	220KΩ	½		BTS-220K	
R48	47KΩ	½		BTS-47K	
R49	1000Ω	½		BTS-1000	
R50	12KΩ	½		BTS-12K	
R51	33KΩ	1		BTA-33K	Note 3
R52	1000Ω	½		BTS-1000	
R53	15KΩ	½		BTS-15K	

ITEM No.	RATING: OHMS	WATT	Mirrortone Part No.	IRC Part No.	NOTES
R54	15KΩ	½		BTS-15K	
R55	10Meg	½		BTS-10Meg	
R56	4700Ω	½		BTS-4700	
R57	330Ω	½		BTA-330	Note 4
R58	330KΩ 5%	1		BTS-330K 5%	
R59	180KΩ 5%	1		BTS-180K 5%	
R60	18KΩ	½		BTS-18K	
R61	2.2Meg	½		BTS-2.2Meg	
R62	470KΩ	½		BTS-470K	
R63	4700Ω	½		BTS-4700	
R64	47KΩ	½		BTS-47K	
R65	100KΩ	½		BTS-100K	
R66	15KΩ	½		BTS-15K	
R67A	22KΩ	½		BTS-22K	
B	8200Ω	½	±CMX-10012	BTS-8200	
C	6200Ω	½		BTS-6200	
R68	47KΩ	½		BTS-47K	
R69	100KΩ	½		BTS-100K	
R70	680KΩ	½		BTS-680K	
R71	22KΩ	½		BTS-22K	Note 8
R72	33KΩ	½		BTS-33K	
R73	330KΩ	½		BTS-330K	
R74	100Ω	½		BTS-100	
R75	470KΩ	½		BTS-470K	
R76	680KΩ	½		BTS-680K	
R77	1Meg	½		BTS-1Meg	Note 5
R78	4700Ω	½		BTS-4700	
R79	2.2Meg	½		BTS-2.2Meg	
R80	560Ω	½		BTS-560	
R81	560Ω	½		BTS-560	
R82	470KΩ	½		BTS-470K	
R83	47KΩ	½		BTS-47K	
R84	150KΩ	½		BTS-150K	
R85	5600Ω	½		BTS-5600	
R86	100KΩ	½		BTS-100K	
R87	220KΩ	½		BTS-220K	
R88	1Meg	½		BTS-1Meg	
R89	68Ω	½		BTS-68	
R90	8200Ω	½		BTS-8200	
R91	2.2Ω	3			
R92	8200Ω	3		BTB-8200	
R93	200Ω	10		1 S/4A-200	
R94	1500Ω	1		BTA-1500	
R95	1700Ω	1		BTA-1700	
R96	2700Ω	1		BTA-2700	Note 2
R97	22KΩ	½		BTA-22K	Note 2
R98	470Ω	½		BTS-470	Note 2

* Items R67A, R67B, R67C, C49A, C49B, C49C are combined in one unit.
Note 1. Some models may use a single 5000Ω, 4 watt resistor in this application.
Note 2. Not used in all models.
Note 3. Some models may use a 39KΩ resistor in this application.
Note 4. Some models may use a 390Ω resistor in this application.
Note 5. Some models may use a 820KΩ resistor in this application.
Note 6. Some models may use a 68Ω resistor in this application.
Note 7. Some models may use a 470KΩ resistor in this application.
Note 8. Some models may use a 330KΩ resistor in this application.
Note 9. Some models may use a 47KΩ resistor in this application.
Note 10. Some models may use a 100KΩ resistor in this application.

TRANSFORMER (POWER)

ITEM No	RATING: PRI	SEC 1	SEC 2	REPLACEMENT DATA: Mirrortone Part No.	Stancor Part No.	Merit Part No.	Triad Part No.	RCA TYPE No	Halldorson Part No.	Thordarson Part No.
T1	117VAC @ 1.64A	746VCT @ .220ADC	5VAC @ 3A	TPC-1001	P-8189 ①	P-3078	R-37DC	201T10	P8731 ②	
		SEC 3	SEC 4	SEC 5						
		6.3VAC @ 2.2A	6.3VAC @ 3.3A							

① Drill new mounting holes.
② Tape 6.3V@1.2A winding.

TRANSFORMERS (SWEEP CIRCUITS)

ITEM No	USE	REPLACEMENT DATA: Mirrortone Part No.	Stancor Part No.	Merit Part No.	Triad Part No.	RCA TYPE No	Halldorson Part No.	Thordarson Part No.
T2	Horiz.Output Trans.	THC-10017C		HVO-10* ①	D-33* ①	221T1 & 216R1 *	FB410 *	
T3	Vert.Output Trans.	TOB-10045E	A-8123	A-303T ①	A-102X	222T1	21804	26852
T4A	Yoke-Horiz. (10MH)	YDB-10001C	DY-2A	MDF-70	Y-21-1	206D1 ②	DF601	Y-6 ④
B	Vert. (41MH)							
T5	Width Coil (.09-.3MH)	TOA-10033C	WC-1			20UR1		WC-10

① Drill new mounting holes.
② Use original yoke network.

*HORIZONTAL OUTPUT TRANSFORMER CONNECTION DATA

Use Original Width Coil Unless Replacement Type Is Listed

ORIGINAL TERMINAL CONNECTIONS	Stancor Replacement Connections	Merit Replacement Connections	Triad Replacement Connections	RCA Replacement Connections	Halldorson Replacement Connections	Thordarson Replacement Connections
3		3	3	Hi-Volt Rect Plate Lead	Hi-Volt Rect Plate Lead	
2		2	2	3	9	
1		1	1	1	4	
7		4	4	9	8	
4		5	5	8	6	
5		8	8	5	5	
6		6	6	4	7	
8		9	9	216R1 Term. C	U	
9		7	7	216R1 Term. B	L	
Connect Width Coil Across	5 & 6	8 & 6	8 & 6	216R1 Turns 'A' & "B" 5 & 4	5 & 7	
Special Notes				②		

④ If the picture is out of phase, reverse primary or secondary of 216R1.

TRANSFORMER (AUDIO OUTPUT)

ITEM No	IMPEDANCE: PRI.	SEC.	REPLACEMENT DATA: Mirrortone Part No.	Stancor Part No.	Merit Part No.	Triad Part No.	Halldorson Part No.	Thordarson Part No.	NOTES
T6	5.1KΩ	3.8Ω	TOC-10034C	A-3877 ①	A-3026	S-32X ①	21001 ①	24651 ①	① Drill one new mounting hole.

SPEAKER

ITEM No.	RATINGS: SIZE	FIELD	V C IMP	REPLACEMENT DATA: Mirrortone Part No.	VIKING Part No.	QUAM Part No.	NOTES
SP1	10"	PM	3.8Ω	SR-10028 ① SR-10020 ②	10J11	10A31	① Alternate 4" PM speaker ② Alternate 5" PM speaker

COILS (RF-IF)

ITEM No.	USE	DC RES.: PRI.	SEC	REPLACEMENT DATA: Mirrortone Part No.	MEISSNER Part No.	MERIT Part No.	MILLER Part No.	NOTES
L1	Ant. Coils	0Ω CT	0Ω					
L2	Fil. Choke	0Ω						
L3	RF, Mixer Grid & Osc. Coils	0Ω						
L4	Fil. Choke	0Ω						
L5	1st. Video IF	.5Ω						
L6	2nd. Video IF	.1Ω	.1Ω	TSA-10054B	I7-1062	TV-116	6350	
L7	Fil. Choke	0Ω		LGA-10038A	19-3001	TV-189	6175	.4 Microhenry
L8	3rd. Video IF	.1Ω	.1Ω	TSA-10054B	I7-1063	TV-116	6249	
L9	4th. Video IF	.1Ω	.1Ω	TSA-10054B	I7-1063	TV-116	6249	
L10	5th. Video IF	.1Ω	.1Ω	TSA-10054B	I7-1064	TV-116	6350	
L11	Series Peaking Coil	8.5Ω		LGA-10032	19-3125		6153	130 Microhenries
L12	Shunt Peaking Coil	1Ω		LGA-10033	19-3180	TV-184	6180	180 Microhenries
L13	Series Peaking Coil	9.5Ω		LGA-10034	19-3093	TV-181	6177	100 Microhenries
L14	Sound IF	1.8Ω		TSA-10059C	I7-3400	TV-151	1470	
L15	Ratio Det.	8.5Ω	.60CT	TSB-10063A	I7-1053	TV-110	1468	Tertiary winding -.3Ω
L16	Horiz.Osc.	60Ω		LGA-10017B	19-1578	TV-163	6210	

PARTS LIST AND DESCRIPTIONS (Continued)

FUSES

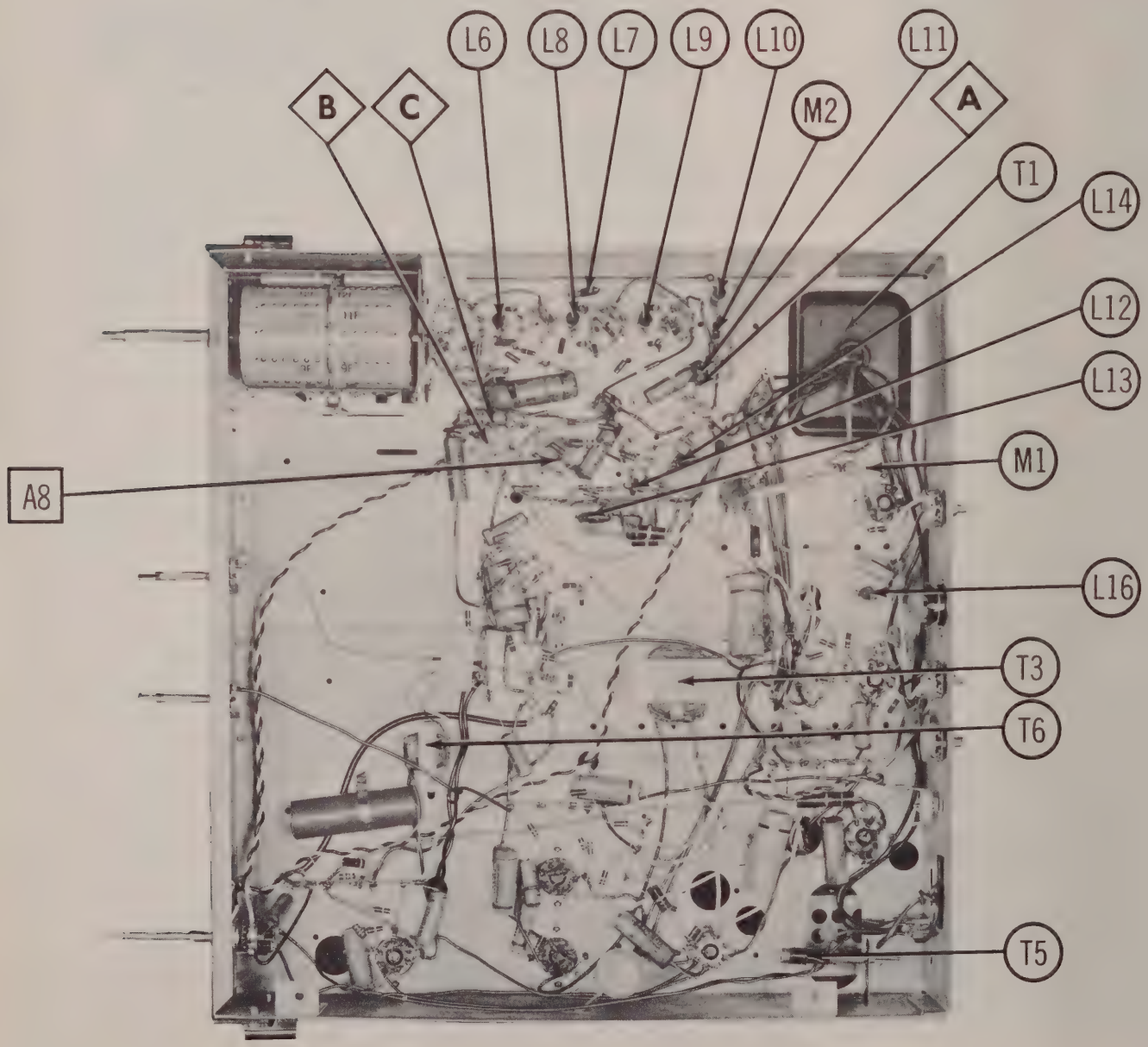
ITEM No.	TYPE	RATING	REPLACEMENT DATA					
			Mirrortone PART No.		LITTELFUSE PART No.		BUSS PART No.	
			FUSE	HOLDER	FUSE	HOLDER	FUSE	HOLDER
M1	3AG S/B	½A 125V			313.500 (3AG S/B -½A)	(1) 121004 & (1) 121001	MDL½	(2) 4432

CRYSTAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA			NOTES
		Mirrortone PART No.	SYLVANIA PART No.	FEDERAL PART No.	
M2	1N64		1N60 , 1N132	1N60, 1N64A	Video Detector

MISCELLANEOUS

ITEM No.	PART NAME	Mirrortone PART No.	NOTES
M3	Tuner	TT-10012	VHF Chassis 9050, 9054
	Tuner	TT-10014	VHF Chassis 9048, 9052
M4	Centering Magnet	MDA-10002	
M5	Ion Trap	ITA-10003	
B2	Trimmer Cap.	CTA-10005	Horiz.Drive (25-280MMF)



CHASSIS BOTTOM VIEW-TRANS., INDUCTOR & ALIGN. IDENTIFICATION

TROUBLE SHOOTING AIDS (cont)

PROPERTY OF
L.[illegible] TELEVISION SHOP
[illegible] WEAVER ST.
DENVER, COLORADO

POWER

DEAD SET

If filaments fail to light, check AC interlock assembly. Check switch on volume control T1 and M1. If filaments light, check V20. Check B+ filter and decoupling network for component failure or change of value.

SMALL AND/OR DIM PICTURE

Substitute V20. Check B+ filter and decoupling network.

HIGH VOLTAGE

LOSS OF HIGH VOLTAGE

Check by substitution V16, V17, V18 and V19. Check waveform W16.

If Satisfactory	If Unsatisfactory
Check T2, T4A, T5, C65, C67, C64, R90 and other associated components.	Check C63, C62, C61, C60, L16, R84, R87 and other associated components.

INSUFFICIENT HIGH VOLTAGE

Check by substitution V16, V17, V18 and V20. Check adjustments B2 and B3. Check R92, T2, T4A, T5 and other associated components.

BLOOMING

Check by substitution V17, V18, V19 and V20. Check T5, T2, T4A, R90 and other associated components.

GENERAL

RASTER, SOUND, NO PICTURE

Follow procedure outlined under "Loss of Video".

RASTER, PICTURE, NO SOUND

Follow procedure outlined under "Weak or No Sound".

RASTER, NO PICTURE, NO SOUND

Check by substitution V1, V2, V3, V4, V5, V6, V7 and V12. Check video IF alignment and video IF components.

NO RASTER, NO SOUND

Follow procedure outlined under "Dead Set".

KEYSTONE EFFECT

Check T4 and its associated components.

INTERMITTENT STREAKS

Check high voltage section for corona discharge and arcing.

Symptoms shown are assumed and are not indicative of the quality and workmanship of this equipment.

SERVICING IN THE FIELD

TUNER OSCILLATOR ADJUSTMENTS

Touch-up adjustments of the VHF tuner oscillator circuit may be accomplished by removal of the channel selector and fine tuning knobs. The adjustments are accessible, one at a time, through the small hole in the cabinet to the right of the channel selector shaft.

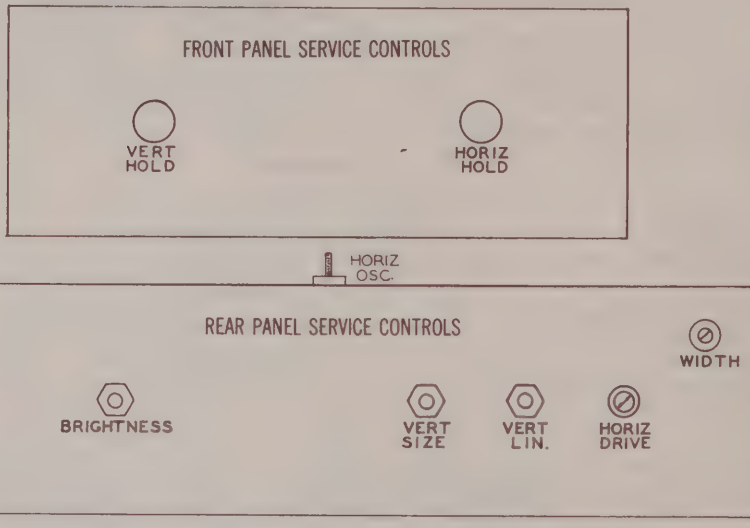
PICTURE TUBE SAFETY GLASS CLEANING

For picture tube safety glass cleaning, it is necessary to remove chassis. (See disassembly instructions).

PICTURE TUBE REMOVAL

For picture tube removal it is necessary to remove chassis. (See disassembly instructions).

SERVICE ADJUSTMENT LOCATION



HORIZONTAL OSCILLATOR FIELD ADJUSTMENT

For adjustment of the horizontal oscillator, it is necessary to remove the rear cover and supply power to set. Adjustment is located on top of chassis. Set the horizontal hold control at the center of its range and adjust the horizontal oscillator slug (L16) until picture synchronizes horizontally. (For location, see tube placement chart).

SOUND IF DETECTOR BUZZ ADJUSTMENT

To eliminate sound IF detector buzz, adjust the ratio detector secondary (L15) located on bottom of chassis. (See tube placement chart).

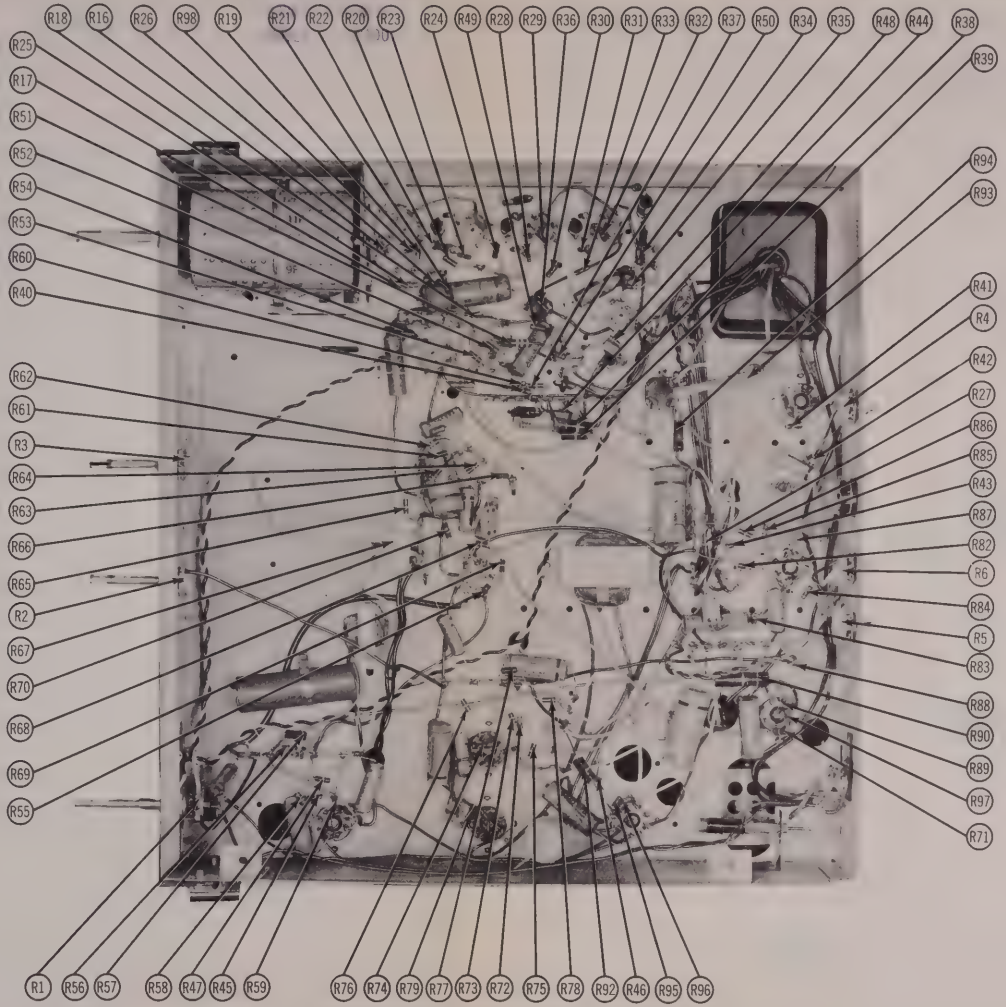
FUSES

One fuse is used for LV power supply protection. (For location, see tube placement chart).

CENTERING

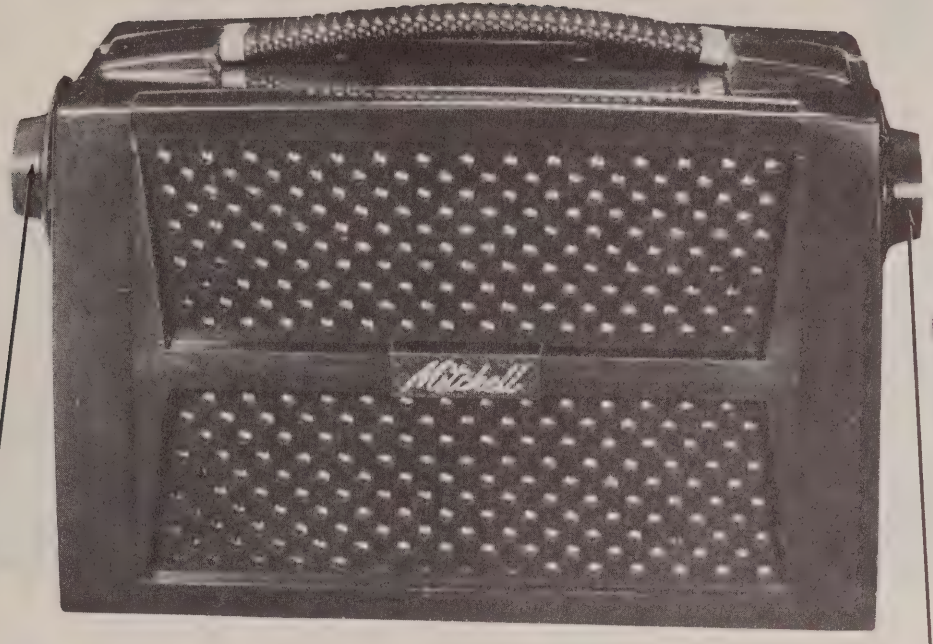
Centering is accomplished mechanically by adjusting a magnetic ring around the neck of picture tube located flush against the yoke. Turn the disc-like knob and at the same time rotate the ring around the tube until picture is properly centered.

1. Remove 4 push-on type control knobs from front panel.
2. Remove 9 wood screws. Remove rear cover.
3. Disconnect speaker plug. Remove 2 speaker nuts. Remove speaker.
4. Remove 2 wood screws from antenna bracket. Remove bracket.
5. Remove 4 chassis bolts.
6. Remove 2 wood screws from front picture tube mount.
7. Remove chassis.



CHASSIS BOTTOM VIEW-RESISTOR IDENTIFICATION

MITCHELL
MODELS 1276, 1277



VOLUME CONTROL ON-OFF SWITCH

TUNING CONTROL

PROPERTY OF
U. S. GOVERNMENT SHIP
DENVER, COLORADO

MITCHELL
MODELS 1276, 1277

TRADE NAME	Mitchell Models 1276, 1277
SUPPLIER	Mitchell Mfg. Co., 2525 Clybourn Ave., Chicago 14, Ill.
TYPE SET	Three Power Portable AM Superheterodyne Receiver
TUBES (Four)	Types 1R5 Conv., 1U4 IF Amp., 1U5 Det.-AVC-AF Amp., 3V4 Audio Output
POWER SUPPLY	110-120 Volts AC-DC (or) 4.5 volts "A" Supply & 90 volts "B" Supply
RATING	.14 Amp. @ 117 Volts AC (or) 100MA @ 4.5 volts DC & 10MA @ 90 Volts DC
TUNING RANGE—BROADCAST	540-1620KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

To set pointer, turn tuning capacitor fully closed and set pointer to last reference mark at low frequency end of dial.
Loop should be maintained in same relative position to chassis as when receiver is in cabinet.
Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.
Use battery power, if possible. If AC power is used, use an isolation transformer when available. If not, connect a .1MFD capacitor in series with low side of the signal generator and B-.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.05MFD	High side to antenna stator lug on tuning gang. Low side to B-	455KC (400~Mod)	Tuning gang fully open	Across voice coil	A1, A2, A3	Adjust for maximum output. If AC power is used without an isolation transformer, reduce dummy antenna to 200MMF to reduce hum modulation.
2.		Loop	1620KC	"	"	A4	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
3.		"	1400KC	Tune to 1400KC signal	"	A5	"
4.		"	600KC	Tune to 600KC signal	"	A6	Adjust for maximum output. Repeat steps 2 and 3.

"The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed." "Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. Copyright 1954 by Howard W. Sams & Co., Inc., Indianapolis 5, Indiana, U. S. of America. Copyright under International Copyright Union. All rights reserved under Inter-American Copyright Union (1910) by Howard W. Sams & Co., Inc." Printed in U. S. of America

PARTS LIST AND DESCRIPTIONS

MITCHELL MODEL 1277

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA		RETMA BASE TYPE	NOTES
		MITCHELL PART No.	STANDARD REPLACEMENT		
V1	Converter	1R5	1R5	7AT	
V2	IF Amplifier	1U4	1U4	6AR	
V3	Det.-AVC-AF Amp.	1U5	1U5	6BW	
V4	Audio Output	3V4	3V4	6BX	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	MITCHELL PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C1A	▲50	150	N-6841	AFH4-34		D028		FP229.6 TCD47	R1367	
B	■30	150								
C	▲30	150								
D	100	25								
C2	.05	200	N-1345	P288-05	DF-503	PJ2S5		PT415	2TM-S5	
C3	50		N-6375	S150	D6-500		GP1K-500	UC-545	5GA-Q5	
C4	.005	600	N-4894	P688-005	D6-502	CUB6D5	GP2-333-502	PT625	6TM-D5	
C5	.1	200	N-1351	P288-1	DF-104	PJ2P1		PT401	2TM-P1	
C6	.002	600	N-6377	P688-002	D6-602	CUB6D2	GP2-333-202	PT622	6TM-D2	
C7	100		N-6015	S1100	D6-101		GP1K-101	UC-531	5GA-T1	
C8	.005	600	N-4894	P688-05	D6-502	CUB6D5	GP2-333-502	PT625	6TM-D5	
C9A	100		♦N-8330	♦PA-117	♦PC-91	♦114TM2	♦1407-03	UC-531	♦P-2	
B	5000							DC-525		
C	5000							DC-525		
C10	.002	600	N-6377	P688-002	D6-602	CUB6D2	GP2L-202	PT622	6TM-D2	
C11	.05	400	N-1346	489ZX-05	DF-503	PJ4S5		PT415	4TM-S5	
C12	.05	200	N-1345	P288-05	DF-503	PJ2S5		PT415	2TM-S5	

♦ Items C9A, C9B, C9C, R8A, R8B, and R8C are combined in one unit.

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	MITCHELL PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	
R1A	1Meg	½	N-8332	Q13-137	A47-1Meg-Z	BSK-70-S	U-53	Volume
B	Shaft		Not Req.	Not Req.	KSS-3	Not Req.	Not Req.	Attach to R1A
C	Switch		Not Req.	76-2	SWE-20	Not Req.	US-27	Attach to R1A

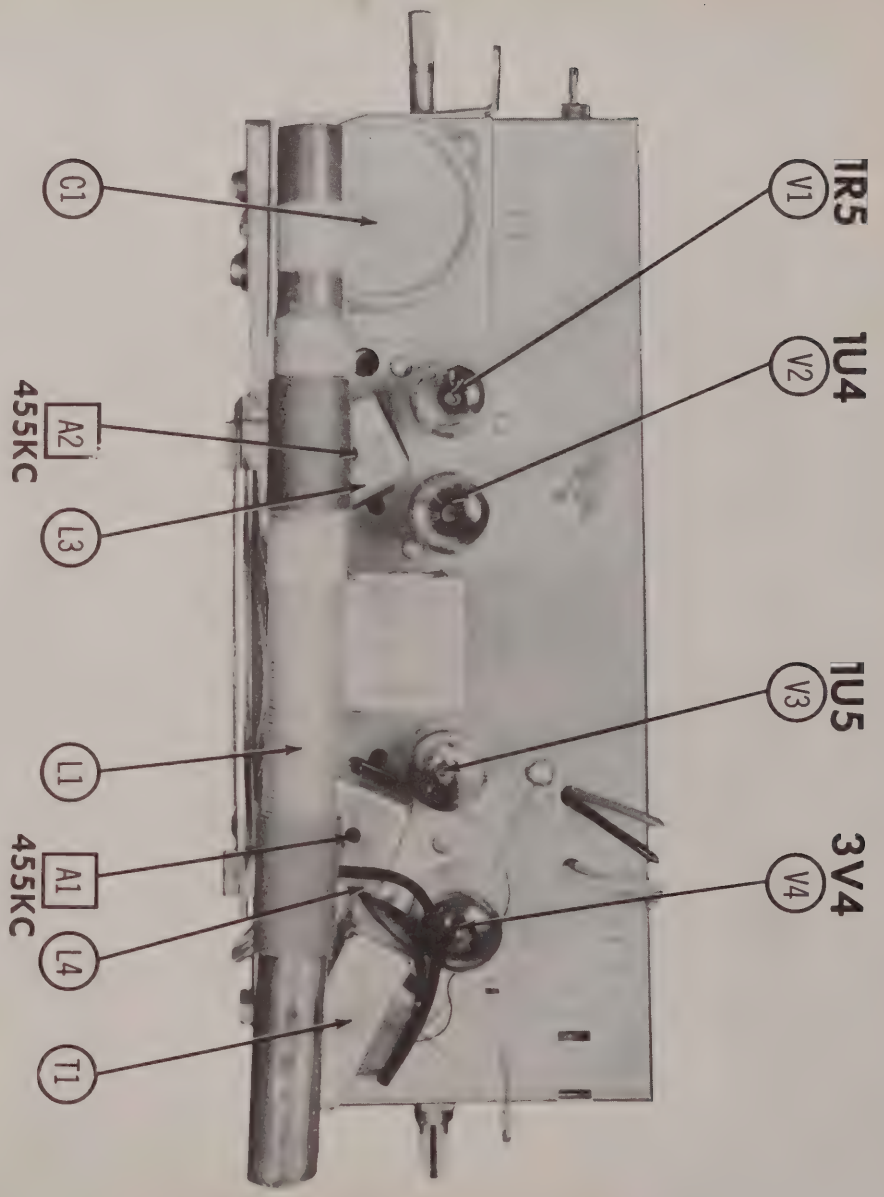
RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	MITCHELL PART No.	IRC PART No.	
R2	100KΩ	½	N-1973	BTS-100K	
R3	22KΩ	½	N-6012	BTS-22K	
R4	6.8Meg	½	N-4028	BTS-6.8Meg	
R5	4.7Meg	½	N-4061	BTS-4.7Meg	
R6	470Ω	½	N-4066	BTS-470	
R7	6.8Meg	½	N-4028	BTS-6.8Meg	
R8A	4.7Meg	½	♦N-8330	BTS-4.7Meg	
B	1Meg	½		BTS-1Meg	
C	2.2Meg	½		BTS-2.2Meg	

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	MITCHELL PART No.	IRC PART No.	
R9	1200Ω	½	N-6793	BTS-1200	
R10	27Ω	½	N-6792	BTS-27	
R11	1200Ω	½	N-6793	BTS-1200	
R12	220KΩ	½	N-4026	BTS-220K	
R13	330Ω	½	N-4420	BTS-330	
R14	2200Ω	½	N-4896	BTS-2200	
R15	82Ω	2	N-4023		
R16A	1150Ω	5.5	N-8333		
B	1150Ω				

♦ Items R8A, R8B, R8C, C9A, C9B, C9C are combined in one unit.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	MITCHELL PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Halldorson PART No.	Thordarson PART No.	
T1	9KΩ	3.2Ω	N-8329	A-3329	A-2927 ①	S-8X	Z1001 ①	24S49	① Drill one new mounting hole.

SPEAKER

ITEM No.	RATINGS			REPLACEMENT DATA			NOTES
	SIZE	FIELD	V. C. IMP.	MITCHELL PART No.	JENSEN PART No.	QUAM PART No.	
SP1	4"	PM	3.2Ω	N-6681	ST-113 Mod. P4-X	4A1	

COILS (RF-IF)

ITEM No.	USE	DC RES.		REPLACEMENT DATA				NOTES
		PRI.	SEC.	MITCHELL PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L1	Ant. Coil	.3Ω		N-8328				
L2	Osc. Coil	1.3Ω	5.5Ω	N-8327	14-1074	BC-381	71-Osc.	
L3	Input IF	14Ω	14Ω	N-7981	16-6758	BC-352	12-C1	
L4	Output IF	25Ω	25Ω	N-8326	16-6758	BC-353	12-C2	

SELENIUM RECTIFIER

ITEM No.	RATING	REPLACEMENT DATA						NOTES
	CURRENT	MITCHELL PART No.	FEDERAL PART No.	INTERNATIONAL PART No.	MALLORY PART No.	SARKES TARZIAN PART No.	SELETRON PART No.	
M1	.062ADC	N-8331	1263A	RS65	6S65	65	5M4	

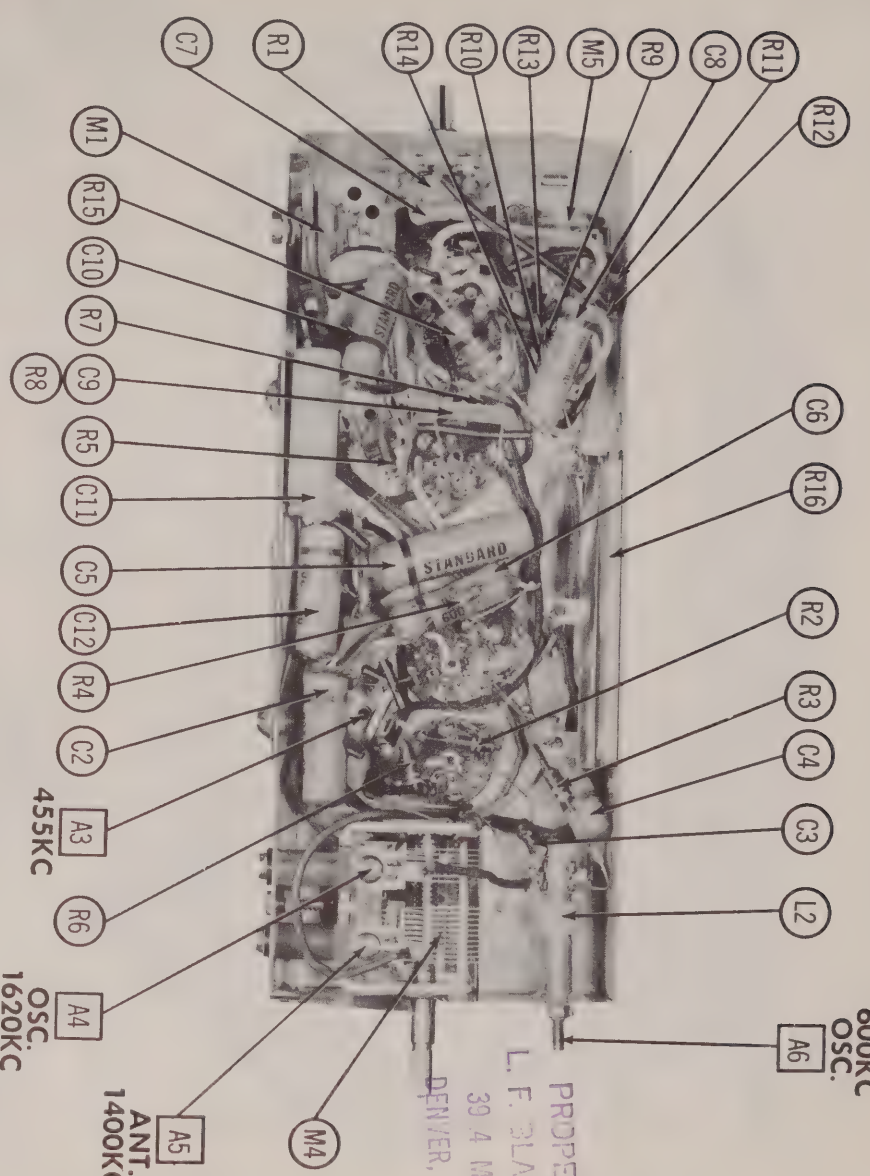
BATTERIES

ITEM No.	VOLTAGE	MITCHELL PART No.	REPLACEMENT DATA						INSTALLATION NOTES
			EVEREADY			BURGESS			
			"A"	"B"	"A-B"	"A"	"B"	"A-B"	
M2	4.5V "A"		736			F3			
M3	90V "B"			490			N-60		

MISCELLANEOUS

ITEM No.	PART NAME	MITCHELL PART No.	NOTES
M4	Tuning Cap.	N-8321	(15-152MMF, 17-292MMF)
M5	Switch	N-5951	Power changeover

CHASSIS—BOTTOM VIEW



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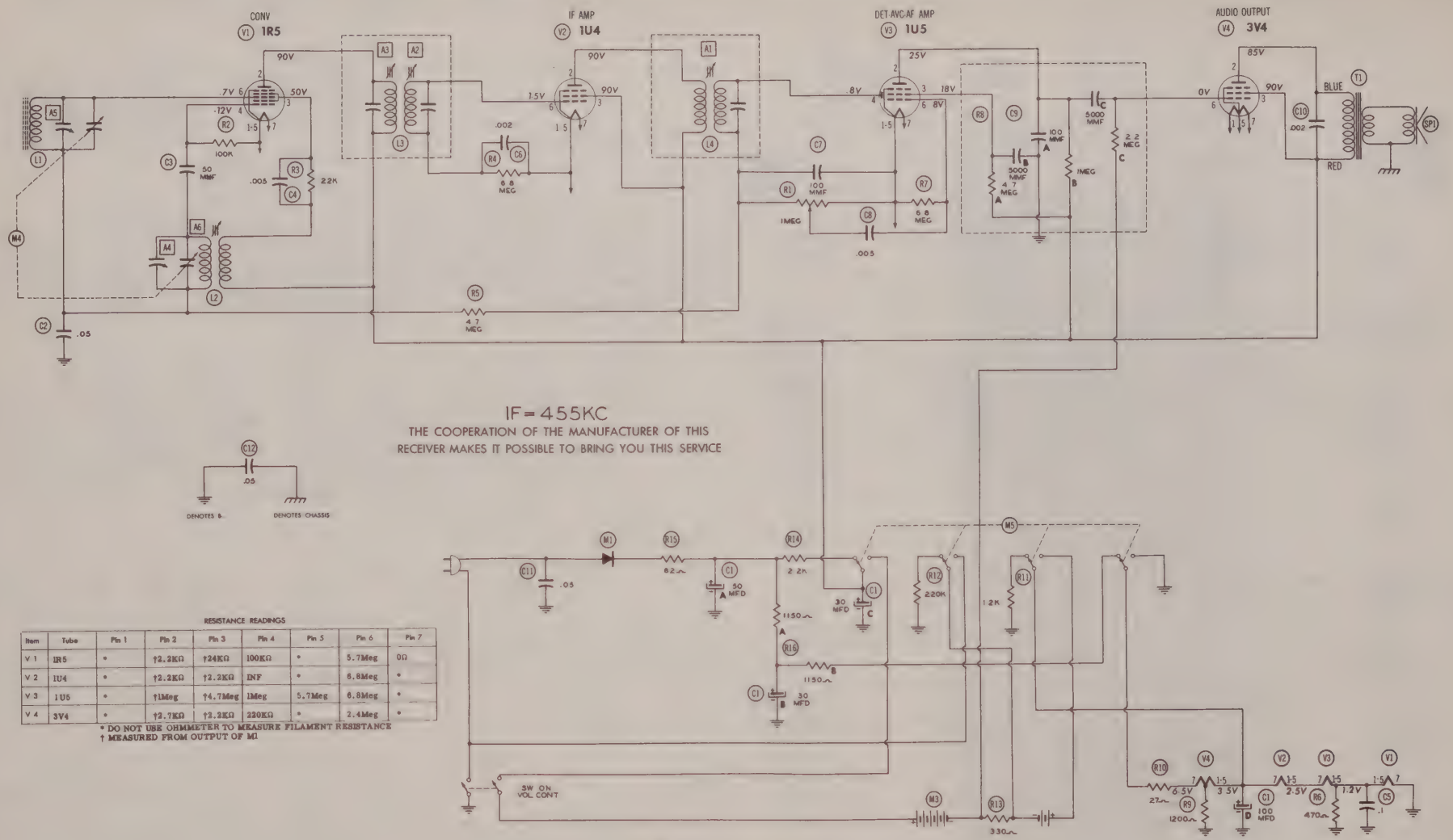
DENVER, COLORADO

MITCHELL MODEL 1277

MITCHELL MODEL 1277



RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V 1	1R5	•	†2.2KΩ	†24KΩ	100KΩ	•	5.7Meg	0Ω
V 2	1U4	•	†2.2KΩ	†2.2KΩ	INF	•	6.8Meg	•
V 3	1U5	•	†1Meg	†4.7Meg	1Meg	5.7Meg	6.8Meg	•
V 4	3V4	•	†2.7KΩ	†2.2KΩ	220KΩ	•	2.4Meg	•

* DO NOT USE OHMMETER TO MEASURE FILAMENT RESISTANCE
† MEASURED FROM OUTPUT OF M1

1. DC voltage measurements taken with vacuum tube voltmeter. AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured voltages are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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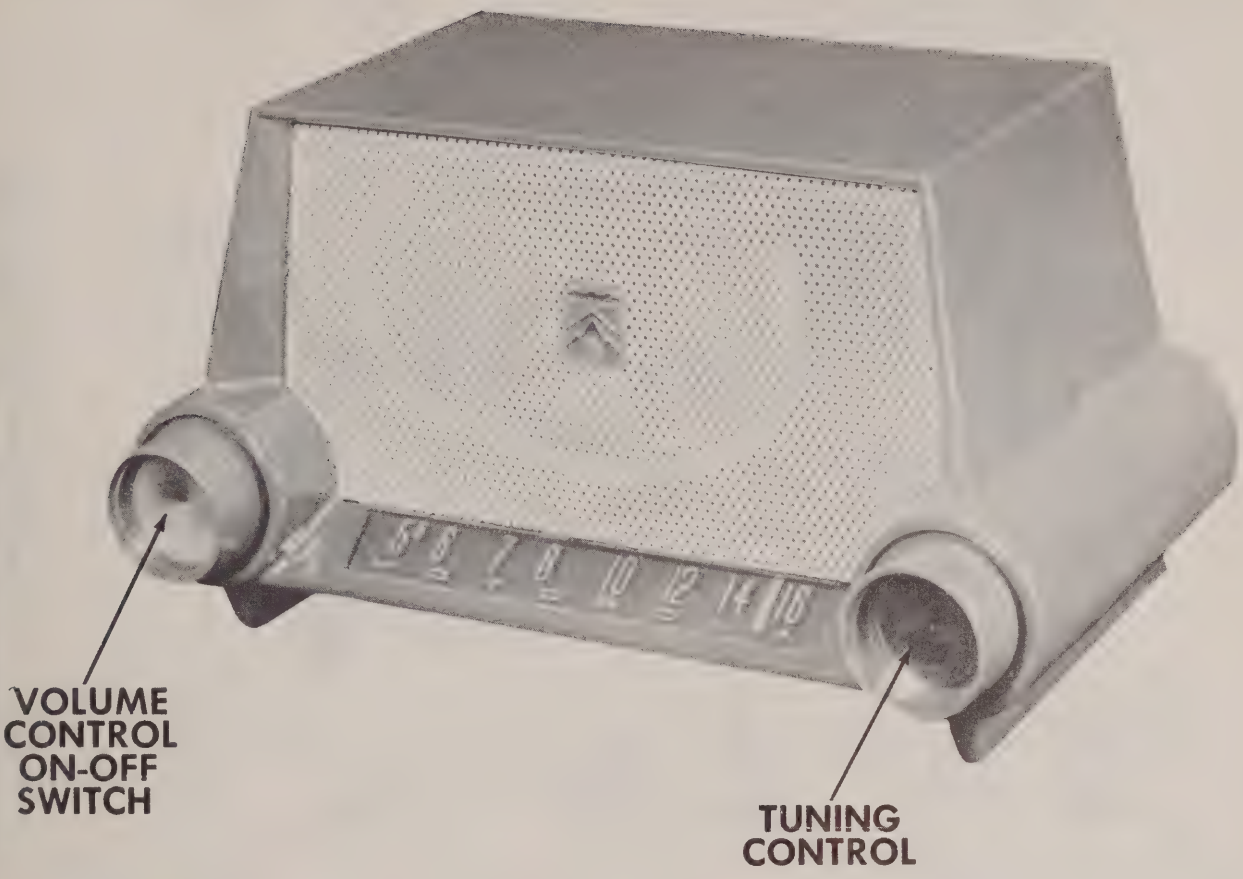
MOTOROLA MODELS
53H1, 53H2, 53H3, 53H4 (Ch. HS-337)



MOTOROLA MODELS
53H1, 53H2, 53H3, 53H4 (Ch. HS-337)

TRADE NAME	Motorola Models 53H1, 53H2, 53H3, 53H4 (Ch. HS-337)
MANUFACTURER	Motorola, Inc., 4545 Augusta Blvd., Chicago 51, Ill.
TYPE SET	AC-DC Operated AM Superheterodyne Receiver
TUBES (Five)	Types 12BE6 Conv., 12BA6 IF Amp., 12AT6 Det.-AVC-AF Amp., 50C5 Audio Output, 35W4 Rectifier
POWER SUPPLY	110-120 Volts AC-DC
RATING	.25 Amp. @ 117 Volts AC
TUNING RANGE—BROADCAST	535-1620 KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

With tuning gang fully closed set dial pointer to coincide with the index mark on the low frequency end of the dial back plate. Use isolation transformer, if available. If not, connect a .1MFD capacitor in series with low side of signal generator and B-. Loop should be maintained in same relative position to chassis as when receiver is in cabinet. Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.1MFD	High side to Pin 7 (grid) of 12BE6 (V1). Low side to B-.	455KC (400~ Mod)	Tuning gang fully open	Across voice coil	A1, A2, A3, A4	Adjust for maximum output. If isolation transformer is not used, reduce dummy antenna to .001MFD to reduce hum modulation.
2.	"	"	1620KC	"	"	A5	"
3.		Loop	1400KC	Tune to 1400KC signal	"	A6	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.

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PARTS LIST AND DESCRIPTIONS

MOTOROLA
MODEL 53H1 (Ch. HS-337)

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA: MOTOROLA PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RETMA BASE TYPE	NOTES
V1	Converter	12BE6	12BE6	7CH	
V2	IF Amplifier	12BA6	12BA6	7BK	
V3	Det.-AVC-AF Amp.	12AT6	12AT6	7BT	
V4	Output	50C5	50C5	7CV	
V5	Rectifier	35W4	35W4	5BQ	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: MOTOROLA PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C1A	50	150	23B610627	PRS150/50-30		BBRD5315		TCD497	TVA-2450	Red
B	30	150								Green
C2	.05	200	8R9821	P288-05	DF-503	PJ2S5		PT415	2TM-S5	
C3A	220				D6-221	TP39	GP1K-221	UC-5322		
B	2000				DD-202	K072	801-002	DC-522		
C	220		♦ 21B482847	♦ PA-100-1	D6-221	TP39	GP1K-221	UC-5322	♦ 34C3	
D	5000				DD-502	K080	801-005	DC-525		
C4	.02	400	8R9802	P48 -02	DF-203	CUB4S2		PT-412	4TM-S2	
C5	.047	400	8R490232	489ZX-047	DF-503	CUB4S47		PT4147	4TM-S47	
C6	.15	200	8R9843	P288-15		PJ2P15		PT4015	2TM-P15	

♦ Items C3A, C3B, C3C and 3CD are combined in one unit.

CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: MOTOROLA PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	1 Meg	½	18K621859	Q13-137	A47-1 Meg-2	BSK-70-S	U-53	Volume
B	Shaft		Not Req.	Not Req.	KSS-3	Not Req.	Not Req.	Attach to R1A
C	Switch		Not Req.	76-I	SWE-12	Not Req.	US-26	Attach to R1A

RESISTORS

ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: MOTOROLA PART No.	IRC PART No.	NOTES
R2	22KΩ	½	6R6028	BTS-22K	
R3	150Ω	½	6R6373	BTS-150	
R4	2.2Meg	½	6R3927	BTS-2.2Meg	
R5	10 Meg	½	6R2109	BTS-10 Meg	
R6	470KΩ	½	6R6032	BTS-470K	

ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: MOTOROLA PART No.	IRC PART No.	NOTES
R7	470KΩ	½	6R6032	BTS-470K	
R8	150Ω	½	6R6373	BTS-150	
R9	1000Ω	1	6R6327	BTA-1000	
R10	27Ω	½	6R5683	BTS-27	

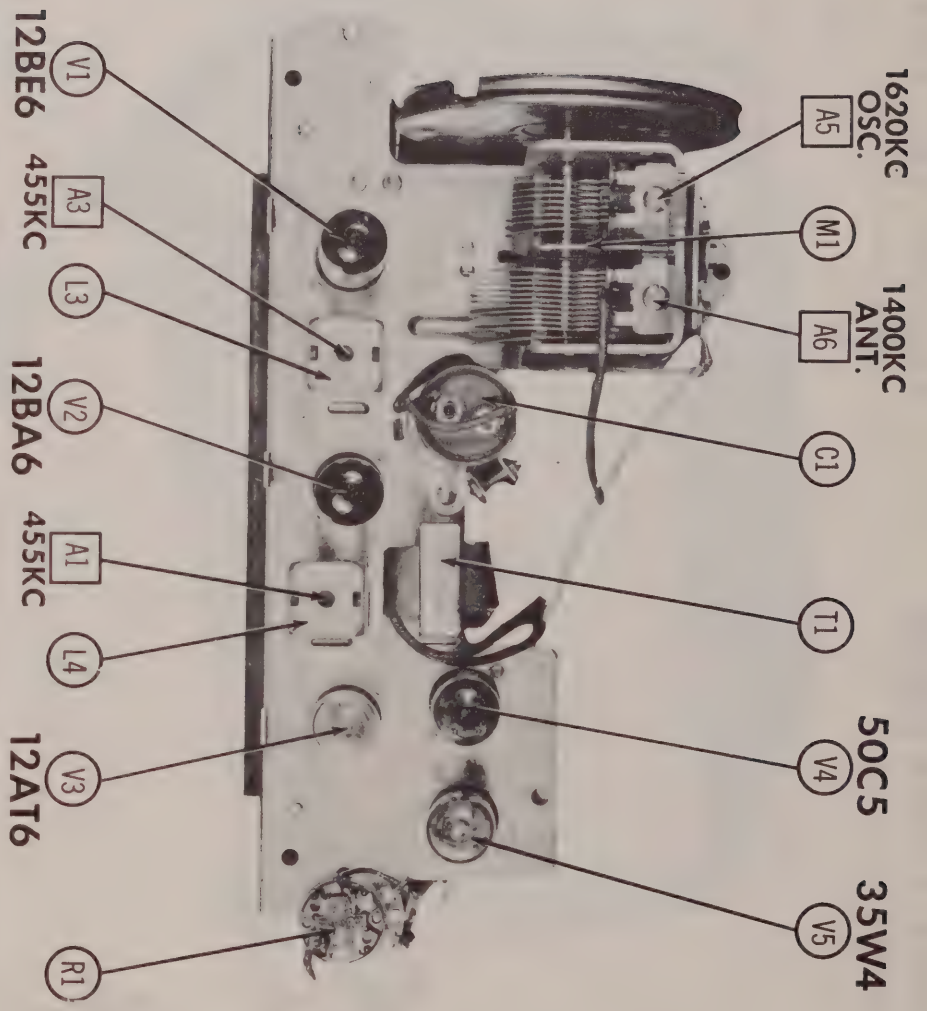
TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE: PRI.	IMPEDANCE: SEC.	REPLACEMENT DATA: MOTOROLA PART No.	Stancor PART No.	Merit PART No.	Trind PART No.	Halldorson PART No.	Thordarson PART No.	NOTES
T1	2.4KΩ	3.2Ω	25B630178A 25K621883 ①						① Alternate audio output transformer.

SPEAKER

ITEM No.	RATINGS: SIZE	RATINGS: FIELD	RATINGS: V. C. IMP.	REPLACEMENT DATA: MOTOROLA PART No.	JENSEN PART No.	QUAM PART No.	NOTES
SP1	4" x 6"	PM	3.2Ω	50C-621882			

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

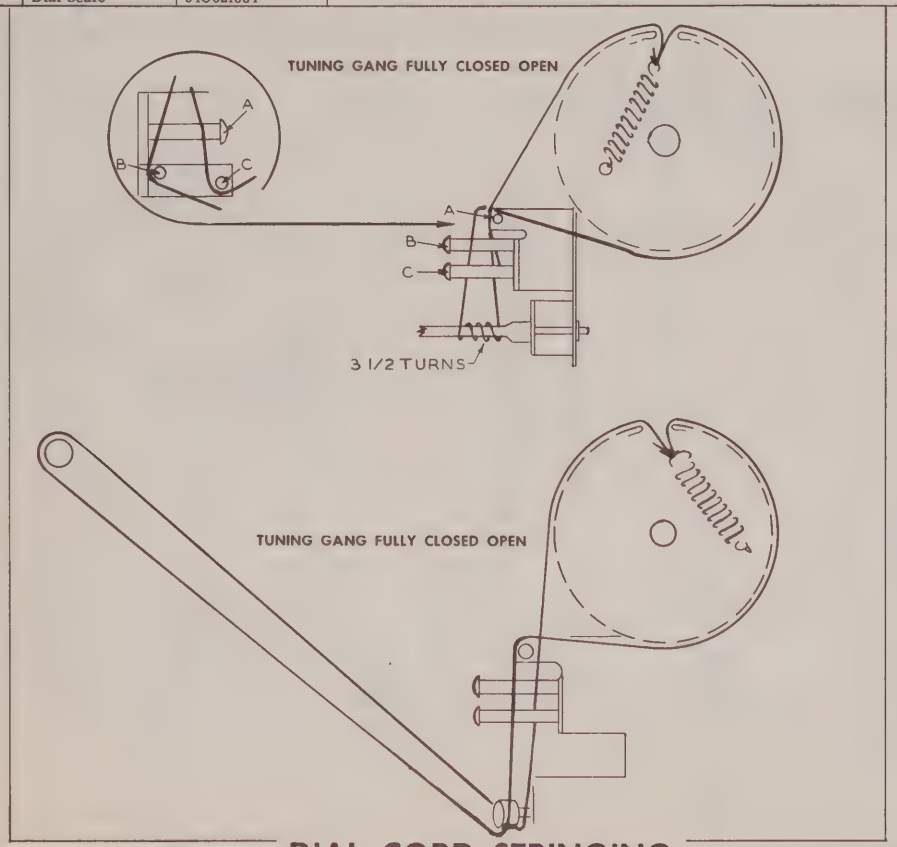
COILS (RF-IF)

ITEM No.	USE	DC RES.		REPLACEMENT DATA				NOTES
		PRI.	SEC.	MOTOROLA PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L1	Loop Ant.	2. 9Ω		24C621880				Includes panel assembly
L2	Osc. Coil	1. 2Ω	11Ω	24K621754	14-1073		69-Osc. †	
L3	Input IF	17Ω	17Ω	24C485553	16-6758	BC-352	12-C1	
L4	Output IF	17Ω	17Ω	24C485553	16-6758	BC-353	12-C2	

† Drill mounting holes.

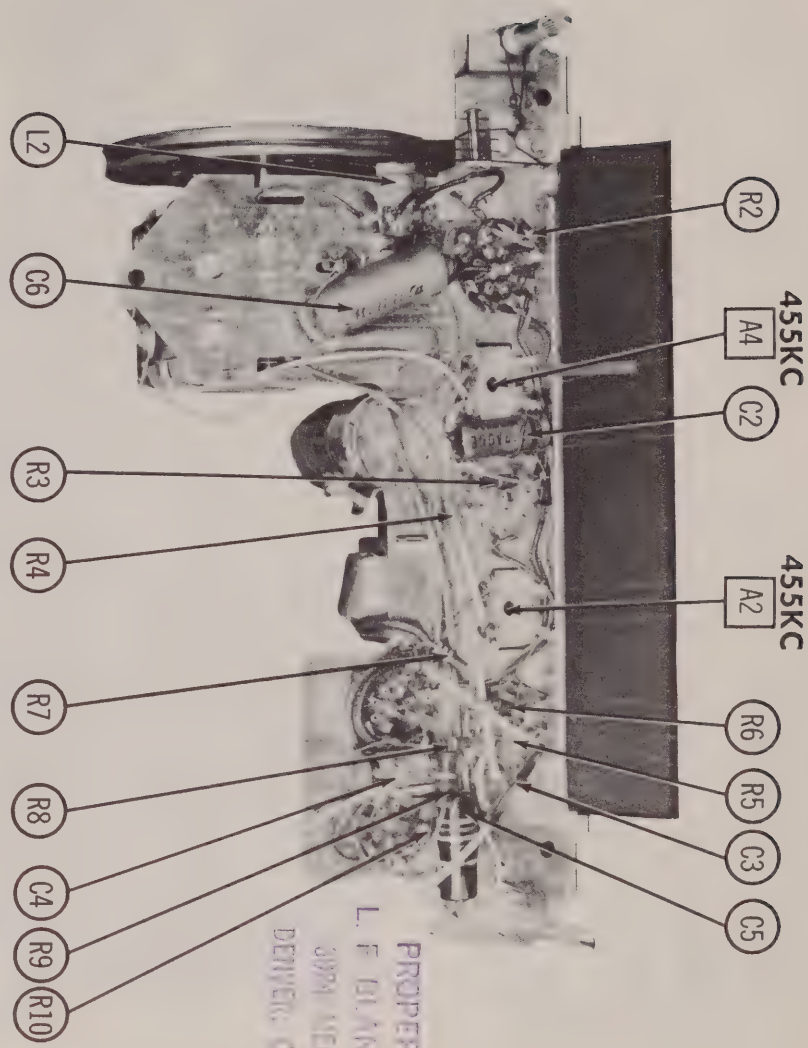
MISCELLANEOUS

ITEM No.	PART NAME	MOTOROLA PART No.	NOTES
M1	Tuning cap	19B621865	(28-385MMF, 17-138MMF)
	Cabinet	16E621729	Ebony-Model 53H1
	Cabinet	16K621731	Gray-Model 53H2
	Cabinet	16K621732	Green-Model 53H3
	Cabinet	16K630086	Red-Model 53H4
	Knob	36B622096	Ebony- 2 used
	Knob	36K630364	Gray- 2 used
	Knob	36K622097	Green- 2 used
	Knob	36K622098	Red- 2 used
	Dial scale	34C621884	



DIAL CORD STRINGING

CHASSIS—BOTTOM VIEW



PROPERTY OF
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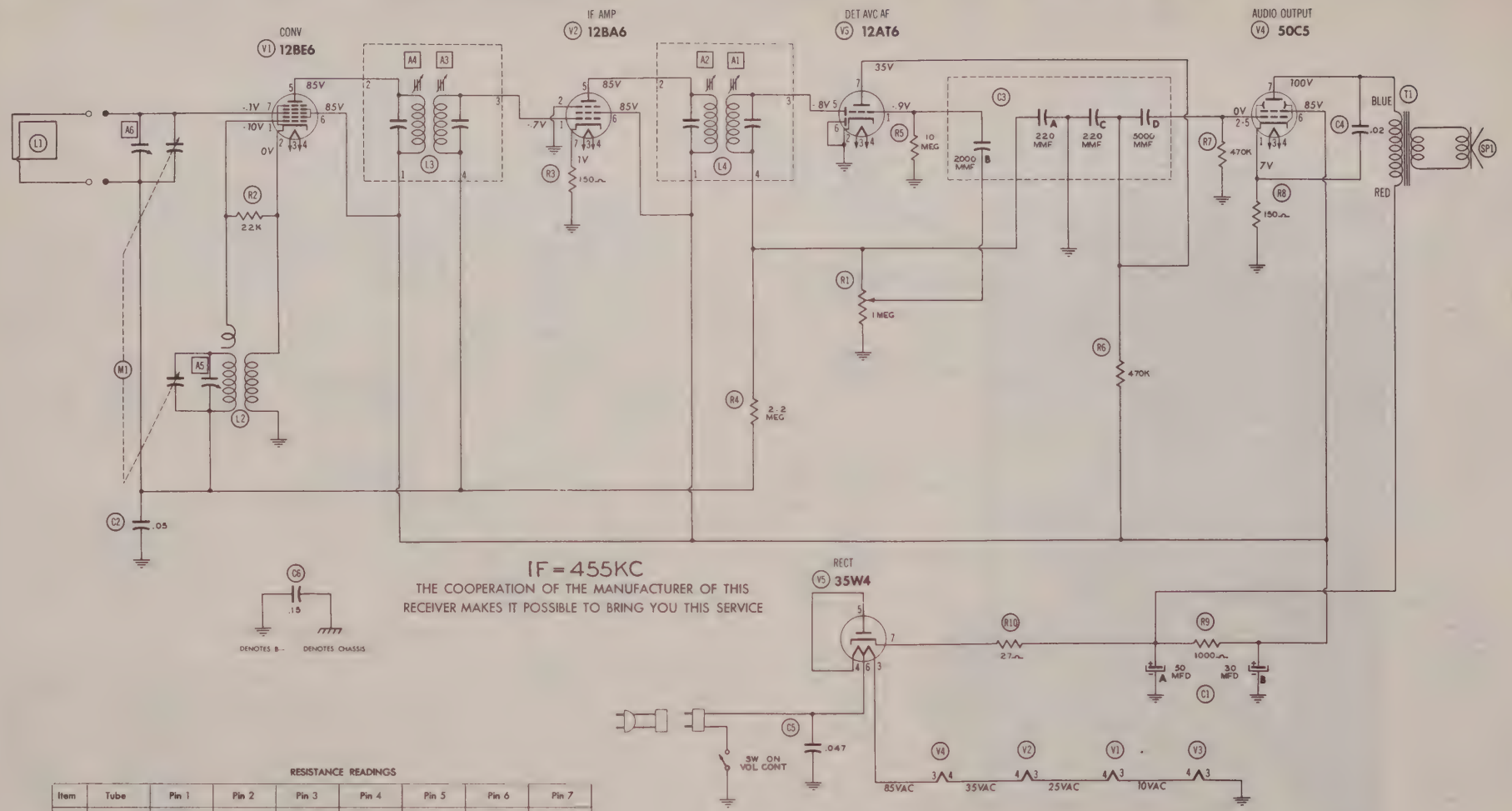
3974 LEADL ST.
DENVER, COLORADO

MOTOROLA
MODEL 53H1 (Ch. HS-337)

MOTOROLA
MODEL 53H1 (Ch. HS-337)



IF = 455KC

THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V 1	12BE6	22KΩ	1. 2Ω	14Ω	26Ω	† 1KΩ	† 1KΩ	3. 2Meg
V 2	12BA6	3. 2Meg	0Ω	26Ω	39Ω	† 1KΩ	† 1KΩ	150Ω
V 3	12AT6	10 Meg	0Ω	0Ω	14Ω	1 Meg	0Ω	† 470KΩ
V 4	50C5	150Ω	470KΩ	88Ω	39Ω	470KΩ	† 1KΩ	† 158Ω
V 5	35W4	† 27Ω	† 27Ω	88Ω	125Ω	125Ω	117Ω	300KΩ

† MEASURED FROM PIN 7 OF V5.

1. DC voltage measurements taken with vacuum tube voltmeter, AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings
5. Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings
6. Volume control at maximum, no signal applied for voltage measurements

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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3921 [illegible]ADE ST.
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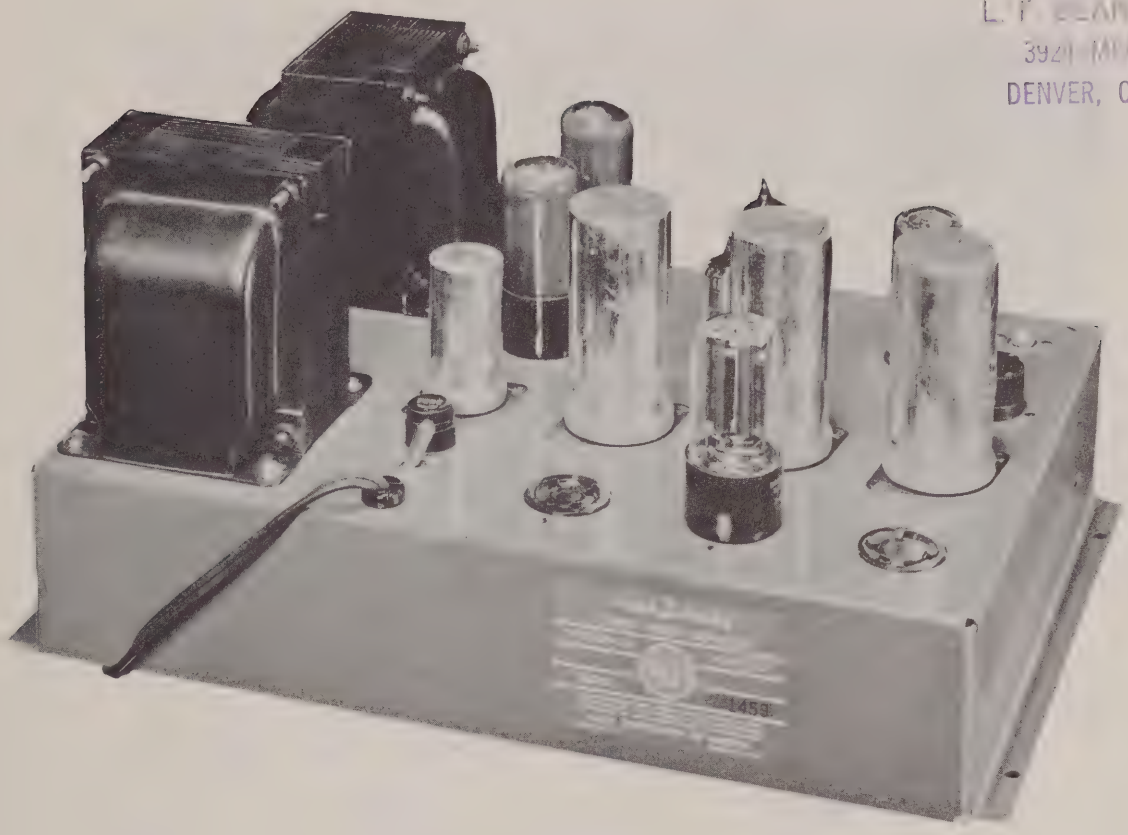
RCA VICTOR
MODEL SP-10 (Ch. MI-12190)



RCA VICTOR
MODEL SP-10 (Ch. MI-12190)

TRADE NAME	RCA Victor Model SP-10 (MI-12190)
MANUFACTURER	RCA Victor Div., Eng. Prod. Dept., Radio Corp. of America, Camden, N.J.
TYPE SET	AC Operated 10 Watt Audio Amplifier
TUBES (Six)	Types 12AU7 AF Amp.-Phase Inv., (2) 6AU6 Driver, (2) 6V6GT Audio Output 5Y3GT Rectifier
POWER SUPPLY	105-125 Volts AC-50/60 Cycles RATING .8 Amp. @ 117 Volts AC

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PARTS LIST AND DESCRIPTIONS

RCA VICTOR
MODEL SP-10 (MI-12190)

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA		RETMA BASE TYPE	NOTES
		RCA Victor PART No.	STANDARD REPLACEMENT		
V1	AF Amp.-Phase Inverter	12AU7	12AU7	9A	
V2	Driver	6AU6	6AU6	7BK	
V3	Driver	6AU6	6AU6	7BK	
V4	Audio Output	6V6GT	6V6GT	7S	
V5	Audio Output	6V6GT	6V6GT	7S	
V6	Rectifier	5Y3GT	5Y3GT	5T	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	RCA Victor PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C1	80	450	18950	AFH1-55		A051		FP149	TVL-1735	
C2	80	450	18950	AFH1-55		A051		FP149	TVL-1735	
C3A	▲40	450	58567	AFH2-57		B045		FP238	TVL-2764	
B	■40	450								
C4A	■50	50	98644	AFH2-06		B008		FP214	TVL-2320	
B	▲50	50								
C5	.47	200	73787	P288-47		PJ2P47		PT4047	2TM-S47	
C6	680	500	39648		1W5T68				MS-37	
C7	.1	400		P488-1	DF-104	CUB4P1		PT401	4TM-P1	
C8	.1	400		P488-1	DF-104	CUB4P1		PT401	4TM-P1	
C9	.047	400	73553	P488-047	DF-503	CUB4S47		PT4147	4TM-S47	
C10	.047	400	73553	P488-047	DF-503	CUB4S47		PT4147	4TM-S47	

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	RCA Victor PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	
R1A	100KΩ	2	98647	QU-128	A47-100K-S	B-40	U-41	Max. input Volt. Adj.-Note
B	Shaft		Not Req.	Not Req.	FS-3	Not Req.	Not Req.	Attach to R1A

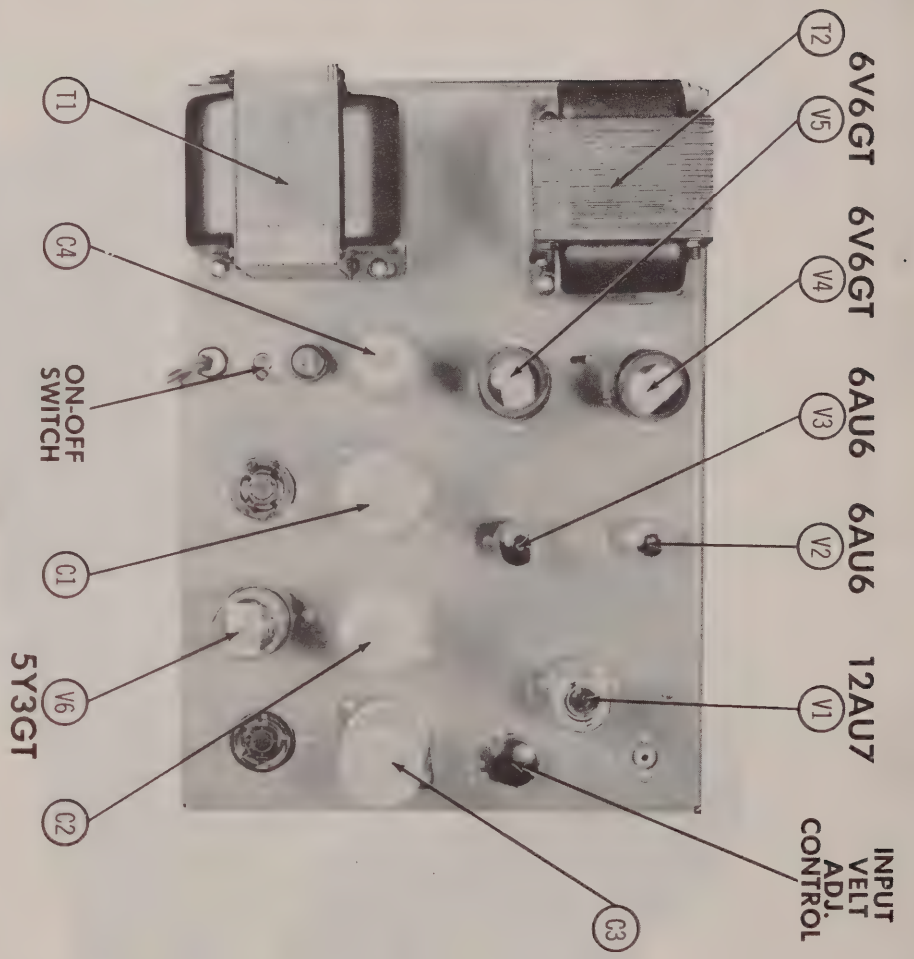
Note: This amplifier is intended for use with a pre-amplifier or tuner. The maximum input voltage control is set for the highest input voltage that will normally be fed into the amplifier and then the volume is controled from either the pre-amplifier or tuner.

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	RCA Victor PART No.	IRC PART No.	
R2	4700Ω	1/2	502247	BTS-4700	
R3	6800Ω 5%	1/2	502268	BTS-6800 5%	
R4	220KΩ 5%	1/2	502422	BTS-220K 5%	
R5	39KΩ 1/2%	1	98642		
R6	39KΩ 1/2%	1	98642		
R7	1Meg 5%	1/2	502510	BTS-1Meg 5%	
R8	330KΩ 5%	1/2	502433	BTS-330K 5%	
R9	1800Ω 1/2%	1	98643		
R10	330KΩ	1/2	502433	BTS-330K	
R11	1Meg 5%	1/2	502510	BTS-1Meg 5%	
R12	330KΩ 5%	1/2	502433	BTS-330K 5%	
R13	1Meg 5%	1/2	502510	BTS-1Meg 5%	
R14	1800Ω 1/2%	1	98643		

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	RCA Victor PART No.	IRC PART No.	
R15	330KΩ	1/2	502433	BTS-330K	
R16	10KΩ	1/2	502310	BTS-10K	
R17	330KΩ	1/2	502433	BTS-330K	
R18	510Ω 5%	2	59069		
R19	100KΩ 1/2%	2	98640		
R20	330KΩ	1/2	502433	BTS-330K	
R21	510Ω 5%	2	59069		
R22	100KΩ 1/2%	2	98640		
R23	390Ω	2	93685	BTB-390	
R24	390Ω	2	93685	BTB-390	
R25	150KΩ	2	14173	BTB-150K	
R26	150KΩ	2	14173	BTB-150K	
R27	10KΩ	2	522310	BTB-10K	

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (POWER)

ITEM No.	RATING				REPLACEMENT DATA					
	PRI.	SEC. 1	SEC. 2	SEC. 3	RCA Victor PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Halldorson PART No.	Thordarson PART No.
T1	117VAC @.8A	686VCT .120ADC	5VAC @ 3A	6.3VCT @1.74A	98679	PM-8410 ①	P-3173 ①	R-14A①	P9312 ①	TS-24R05U ①

① Drill new mounting holes.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	RCA Victor PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Halldorson PART No.	Thordarson PART No.	
T2	8.7KΩ CT	16Ω tap@ 8Ω, 4Ω	98684		A-3101 ①	S-31A ①	H4103 ①	22S44 ①	① Drill new mounting holes.

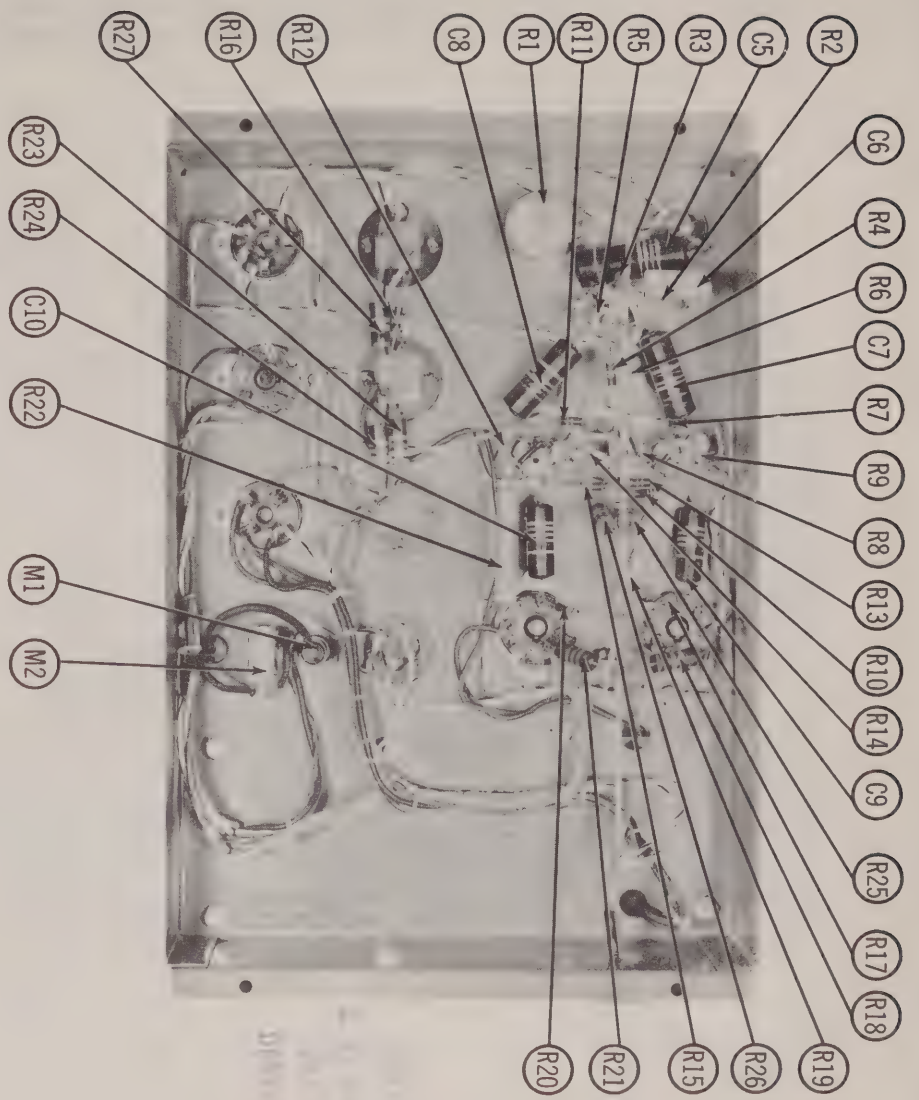
FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA					
			RCA Victor PART No.		LITTELFUSE PART No.		BUSS PART No.	
			FUSE	HOLDER	FUSE	HOLDER	FUSE	HOLDER
M1	3AG S/B	1.5A 125V	98682	48894	31301.5 (3AG S/B 1.5A)	342001	MDL 1 6/10	HKP

MISCELLANEOUS

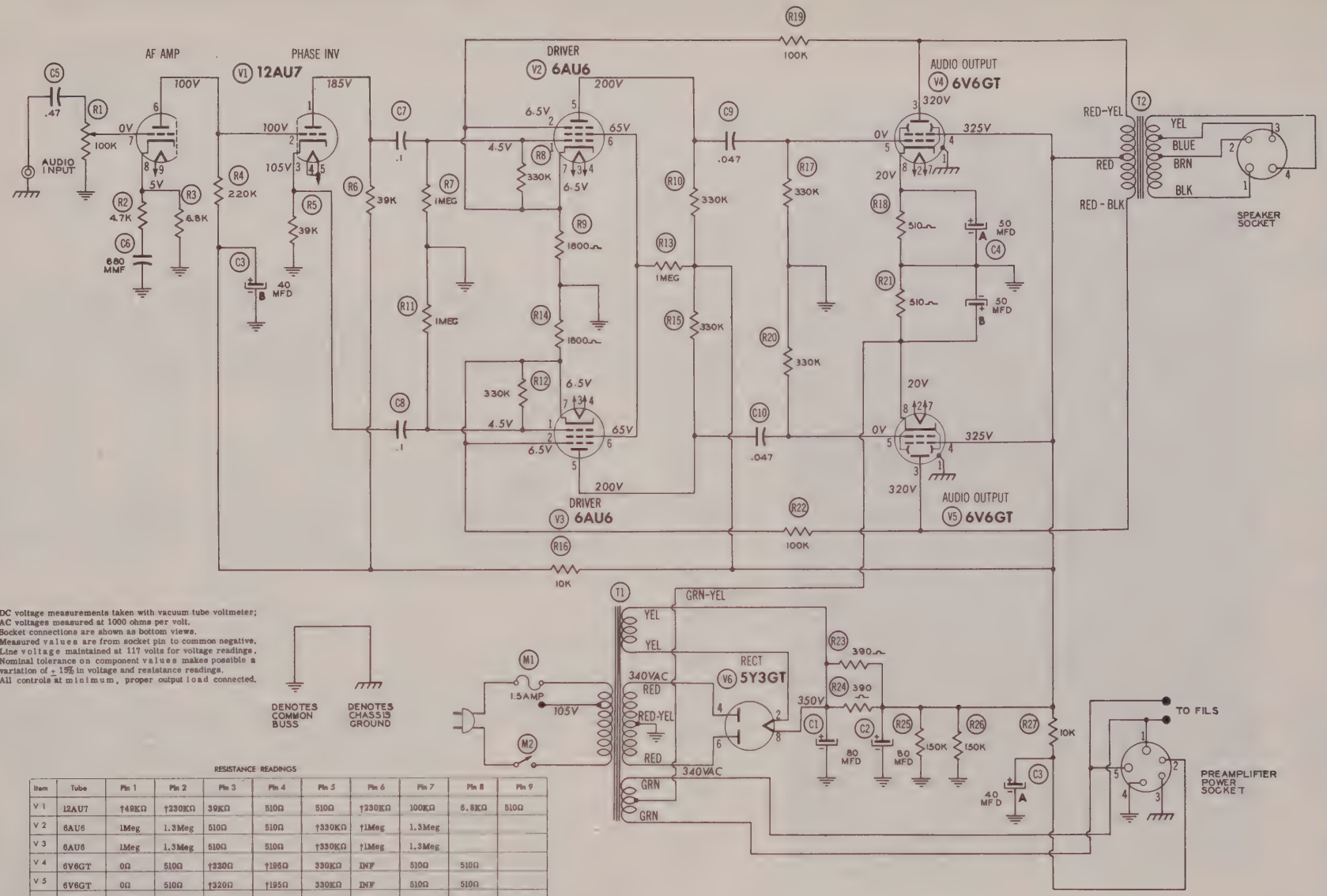
ITEM No.	PART NAME	RCA Victor PART No.	NOTES
M2	Switch	98641	Off/on (toggle)
	Knob	72130	Input Control

CHASSIS—BOTTOM VIEW



RCA VICTOR MODEL SP-10 (MI-12190)

RCA VICTOR MODEL SP-10 (MI-12190)



1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6. All controls at minimum, proper output load connected.

DENOTES COMMON BUSS

DENOTES CHASSIS GROUND

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	12AU7	†49KΩ	†230KΩ	39KΩ	510Ω	510Ω	†230KΩ	100KΩ	6.8KΩ	510Ω
V 2	6AU6	1Meg	1.3Meg	510Ω	510Ω	†330KΩ	†1Meg	1.3Meg		
V 3	6AU6	1Meg	1.3Meg	510Ω	510Ω	†330KΩ	†1Meg	1.3Meg		
V 4	6V6GT	0Ω	510Ω	†320Ω	†195Ω	330KΩ	INF	510Ω	510Ω	
V 5	6V6GT	0Ω	510Ω	†320Ω	†195Ω	330KΩ	INF	510Ω	510Ω	
V 6	5Y3GT	INF	25KΩ	INF	75Ω	INF	70Ω	INF	25KΩ	

† MEASURED FROM PIN 8 OF V6

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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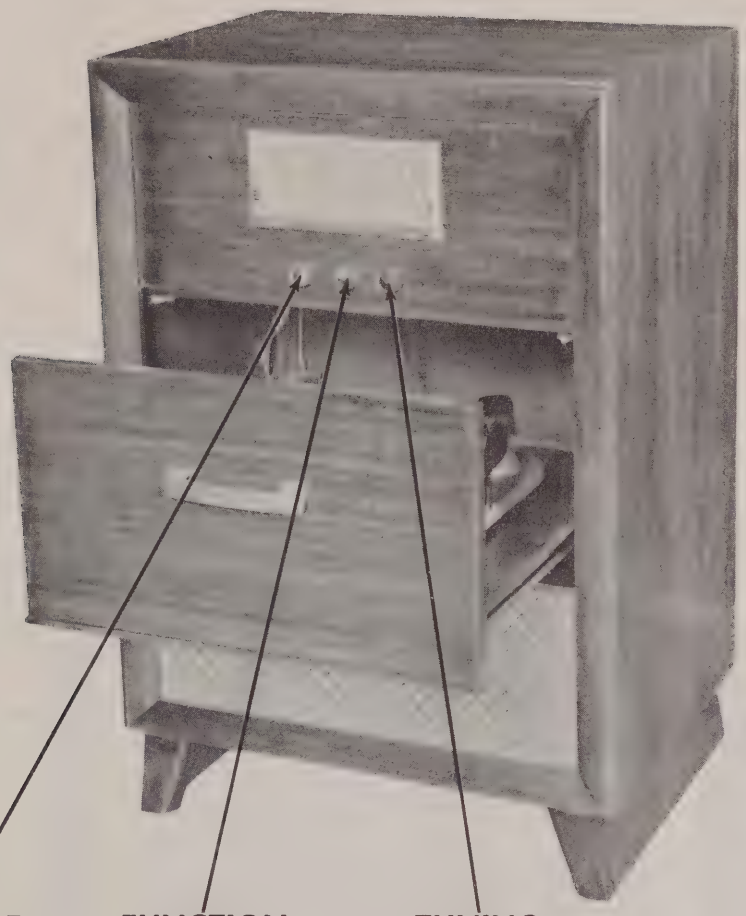
SILVERTONE
MODELS 3054, 3055 (Ch. 132.056)



SILVERTONE
MODELS 3054, 3055 (Ch. 132.056)

TRADE NAME	Silvertone Models 3054, 3055 (Ch. 132.056)
SUPPLIER	Sears, Roebuck & Co., 925 S. Homan, Chicago, Ill.
TYPE SET	AC Operated AM-FM Phono Combination Superheterodyne Receiver With 3 Speed Record changer
TUBES (Eight)	Types 6CB6 FM RF Amp., 12AT7 FM Mixer-FM Osc., 6BE6 AM Conv., 6BA6 FM AM IF Amp., 6BA6 2nd. FM IF Amp., 6T8 Ratio Det.-AM Det.-AF Amp., 6V6GT Audio Output, 6X4 Rectifier
POWER SUPPLY	105-120 Volts AC-60 Cycles — RATING .36 Amp. @ 117 Volts AC
TUNING RANGE -BROADCAST	540-1600KC — FREQ.MOD. 88-108MC

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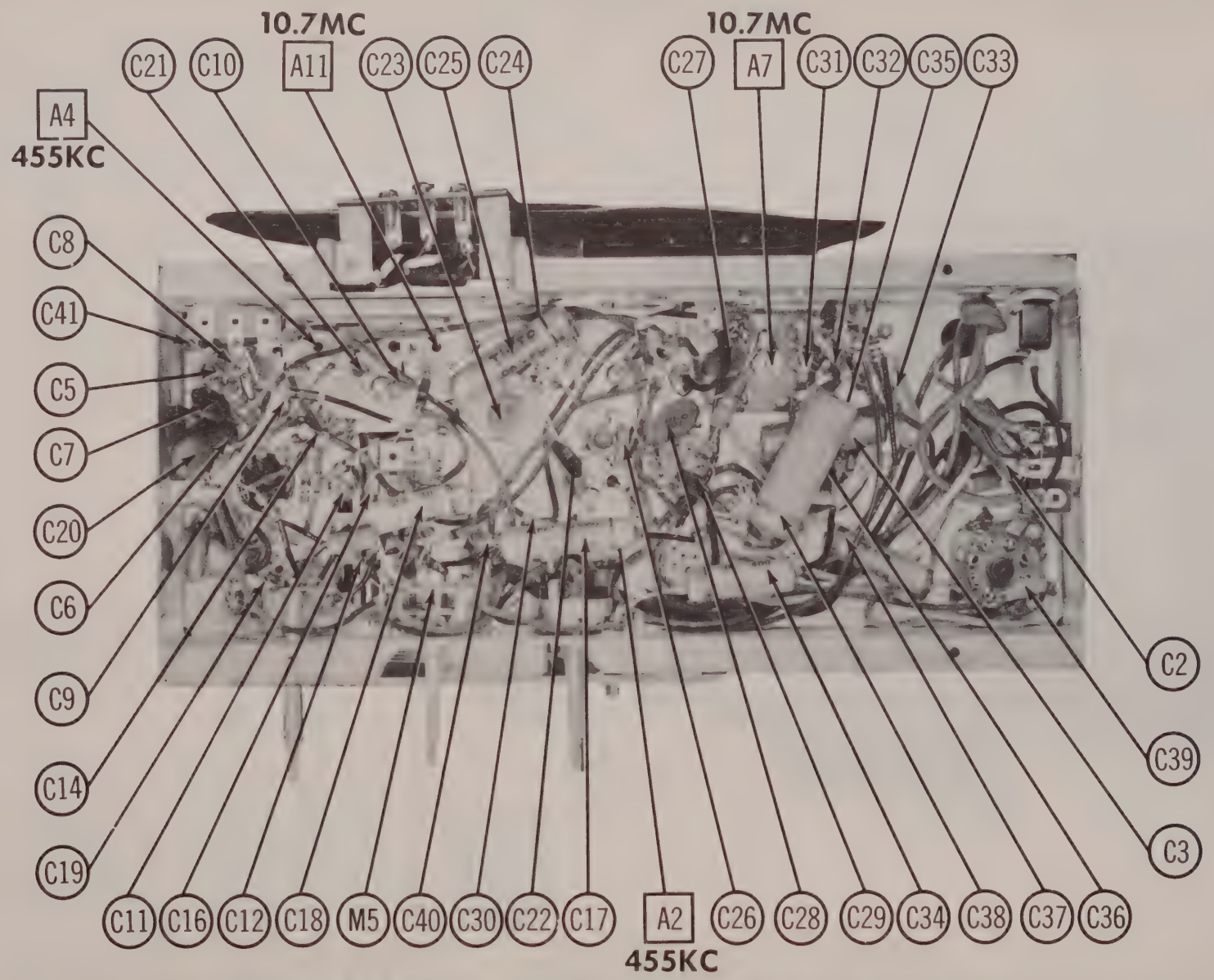
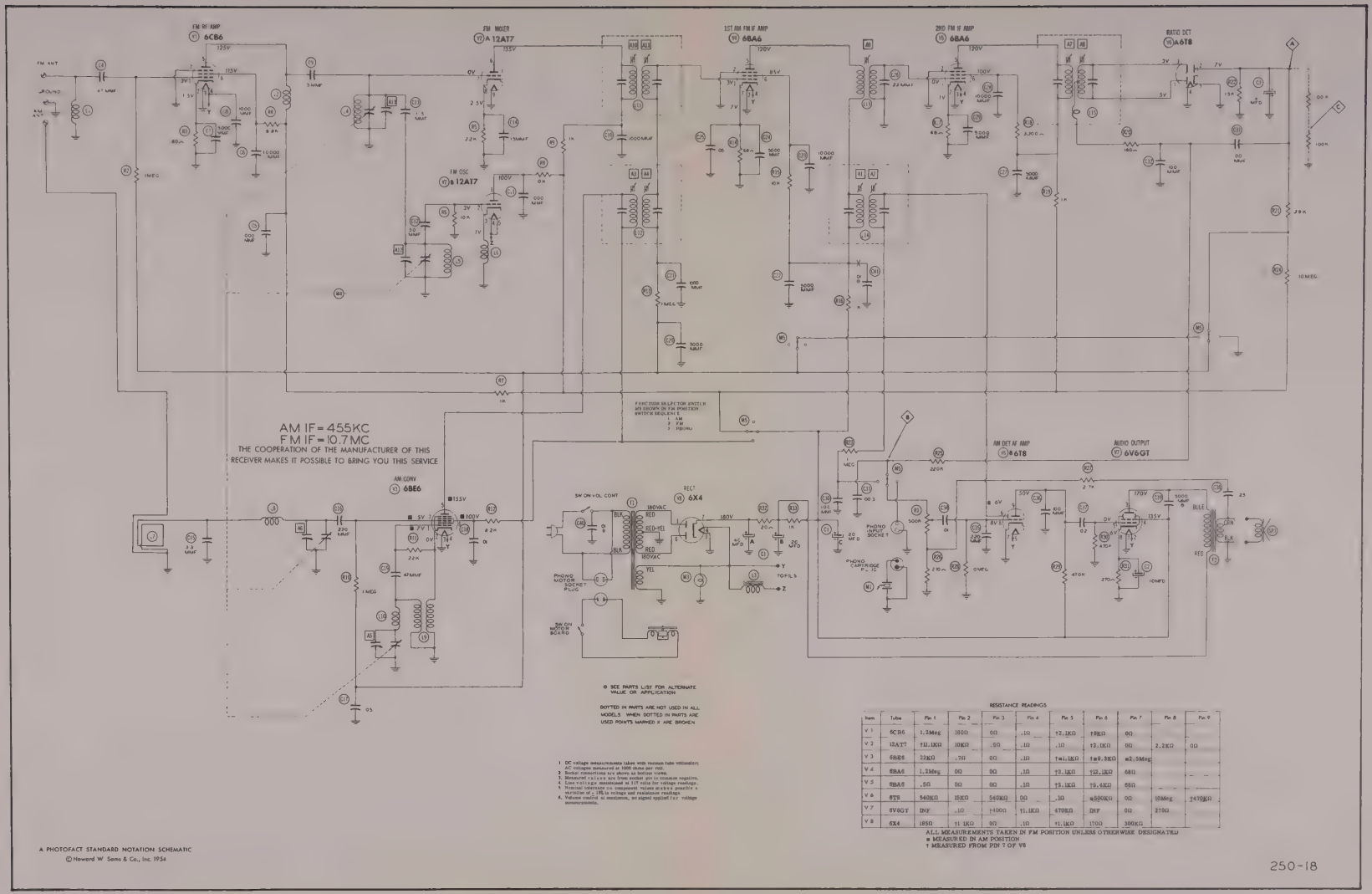


CHASSIS BOTTOM VIEW-CAPACITOR IDENTIFICATION



⊙ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DOTTED IN PARTS ARE NOT USED IN ALL MODELS WHEN DOTTED IN PARTS ARE USED POINTS MARKED X ARE BROKEN

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 cycles per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 10% in voltage and resistance readings.
6. Voltages measured at maximum, no signal applied for voltage measurements.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	6CB6	1.2Meg	180Ω	0Ω	.1Ω	†2.1KΩ	†8KΩ	0Ω		
V 2	12AT7	†11.1KΩ	10KΩ	.5Ω	.1Ω	.1Ω	†2.1KΩ	0Ω	2.2KΩ	0Ω
V 3	6BA6	22KΩ	.7Ω	0Ω	.1Ω	†▲1.1KΩ	†▲9.3KΩ	▲2.5Meg		
V 4	6BA6	1.2Meg	0Ω	0Ω	.1Ω	†2.1KΩ	†12.1KΩ	68Ω		
V 5	6BA6	.5Ω	0Ω	0Ω	.1Ω	†3.1KΩ	†9.4KΩ	68Ω		
V 6	6T8	540KΩ	82KΩ	540KΩ	0Ω	.1Ω	▲800KΩ	0Ω	10Meg	1470KΩ
V 7	6V6GT	INF	.1Ω	†400Ω	†1.1KΩ	470KΩ	INF	0Ω	270Ω	
V 8	6X4	185Ω	71 KΩ	0Ω	.1Ω	†1.1KΩ	170Ω	300KΩ		

ALL MEASUREMENTS TAKEN IN FM POSITION UNLESS OTHERWISE DESIGNATED
▲ MEASURED IN AM POSITION
† MEASURED FROM PIN 7 OF V6

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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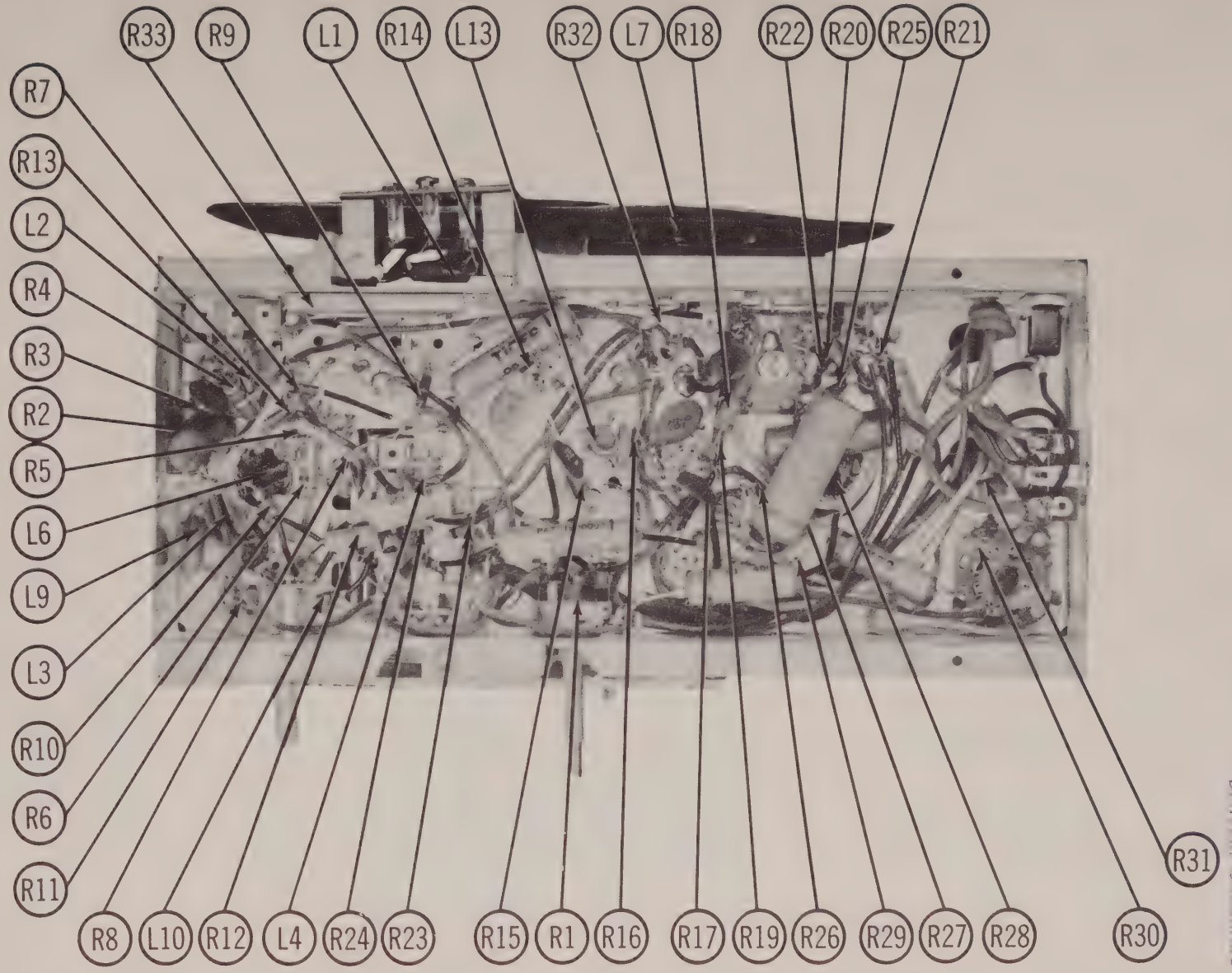
250-18



CHASSIS BOTTOM VIEW-RESISTOR IDENTIFICATION

PROPERTY OF
U. S. NAVY SHIP
DENVER, COLORADO

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

To set pointer, turn tuning capacitor fully closed and set pointer to last reference mark at low frequency end of dial. Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

AM ALIGNMENT

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.05MFD	High side to pin 7 (grid) of 6BE6 (V3). Low side to chassis.	455KC (400~Mod)	AM	Tuning gang fully open	Across voice coil	A1, A2, A3, A4	Adjust for maximum output.
2.		Loop	1650KC	AM	"	"	A5	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
3.		"	1400KC	"	Tune to 1400KC signal	"	A6	"
4.		"	600KC	"	Tune to 600KC signal	"		Bend slotted antenna rotor plates for maximum output. Repeat step 3.

FM IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

Connect two matched 100KΩ (±1%) resistors in series from point Ⓐ to chassis. The junction of these two resistors is alignment point Ⓒ as shown on the schematic.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
5.	.005MFD	High side to pin 1 (grid) of 6BA6 (V4). Low side to chassis.	10.7MC (Unmod)	FM	Point of non-interference	DC probe to point Ⓐ. Common to chassis.	A7, A9	Adjust for maximum deflection.
6.	"	High side to pin 7 (grid) of 12AT7 (V2). Low side to chassis.	"	"	"	"	A10, A11	
7.	"	"	"	"	"	DC probe to point Ⓑ. Common to chassis.	A8	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting.

FM IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use frequency modulated signal with 60% modulation and 450KC sweep. Use 120% sawtooth voltage in scope for horizontal deflection.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT SCOPE	ADJUST	REMARKS
5.	.005MFD	High side to pin 1 (grid) of 6BA6 (V4). Low side to chassis.	10.7MC (450KC Swp)	FM	Point on non-interference	Vert. Amp. to point Ⓐ. Low side to chassis.	A8, A9	Disconnect stabilizing capacitor C3. Adjust for curve of maximum amplitude and symmetry similar to Fig. 1.
6.	"	High side to pin 7 (grid) of 12AT7 (V2). Low side to chassis.	"	"	"	"	A10, A11	"
7.	"	"	"	"	"	DC probe to point Ⓑ. Low side to chassis.	A8	Reconnect stabilizing capacitor C3. Adjust so that 10.7MC occurs at center of cross-over lines as in Fig. 2. SLIGHTLY retouch A7 for maximum amplitude and straightness of crossover lines.

FM RF ALIGNMENT

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
8.	Two 150Ω Carbon Resistors	Across FM antenna terminals with 150Ω in each lead.	108.5MC	FM	Tuning gang fully open	DC probe to point Ⓐ. Common to chassis.	A12	Adjust for maximum deflection.
9.	"	"	87.5MC	"	Tuning gang fully closed	"	L6	Adjust for maximum deflection by compressing or expanding coil turns. Repeat step 8.
10.	"	"	105MC	"	Tune to 105MC signal	"	A13	Adjust for maximum deflection.
11.	"	"	91MC	"	Tune to 91MC signal	"	L5	Adjust for maximum deflection by compressing or expanding coil forms. Repeat step 10.

FIG. 1

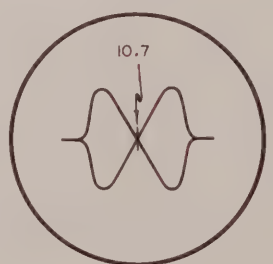


FIG. 2

PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA		RETMA BASE TYPE	NOTES
		Silvertone PART No.	STANDARD REPLACEMENT		
V1	FM RF Amp.	6CB6	6CB6	7CM	
V2	FM Mixer & Osc.	12AT7	12AT7	9A	
V3	AM Converter	6BE6	6BE6	7CH	
V4	1st. AM-FM IF Amp.	6BA6	6BA6	7BK	
V5	2nd. FM IF Amp.	6BA6	6BA6	7BK	
V6	Ratio Detector-AM Det.-AF Amp.	6T8	6T8	9E	
V7	Audio Output	6V6GT	6V6GT	7S	
V8	Rectifier	6X4	6X4	5BS	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

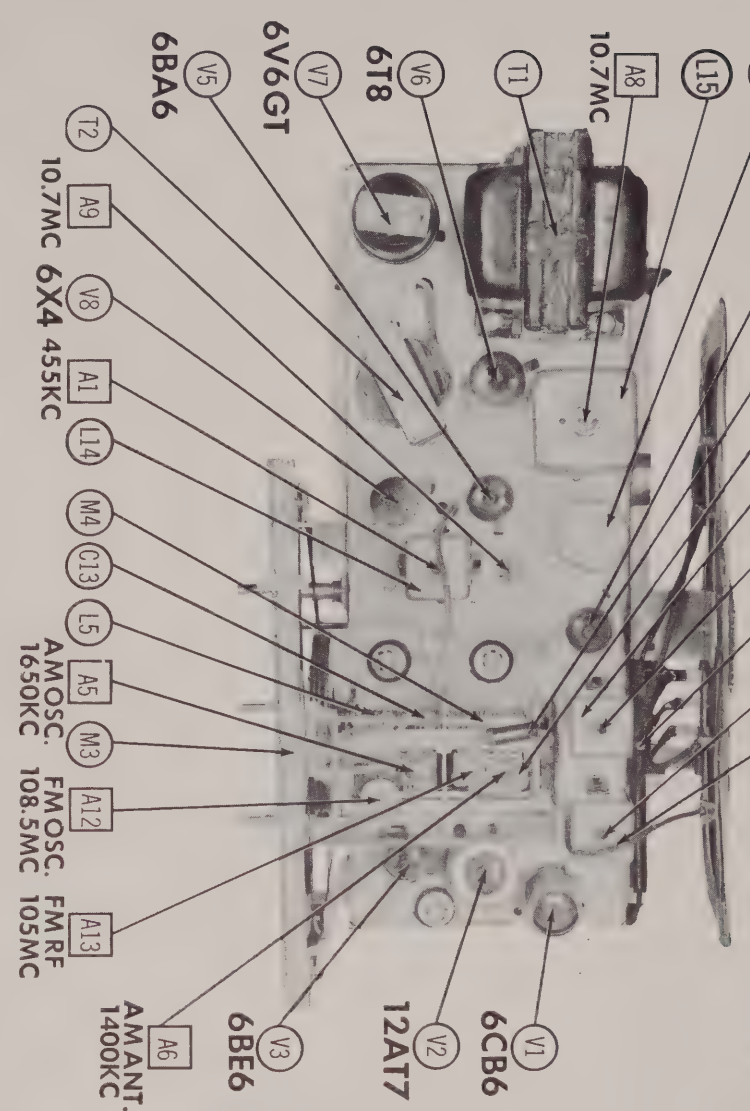
ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	Silvertone PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C1A	■40	250	N22806	AFH3-20		C016		FP230	TVL-3540	
B	▲20	250						TC55		
C	20	250								
C2	10	25	N22602	PRS25/10		BR102		TC22	TVA-1204	
C3	4	25	N22659	PRS150/4		BR550		TC30	TVA-1203	
C4	47			SI47	D6-470	TP29	GP1K-470	UC-5447	5GA-Q47	
C5	1000			BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C6	10000			BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C7	5000			BPD-005	DD-502	K080	801-005	DC-525	5HK-D5	
C8	1000			BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C9	15			SI15	D6-150	TP11	GP1K-150	UC-5415	5GA-Q15	
C10	1000			BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C11	1000			BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C12	50									
C13	1.5			SI1.5NP0	TCZ-1.5	TZ04	NP0K-1R5	ZT-5515	5TCCB-V15	
C14	15			SI15	D6-150	TP11	GP1K-150	UC-5415	5GA-Q15	
C15	3.3			SI3.3NP0	TCZ-3.3	TZ06	NP0K-3R3	ZT-5533	5TCCB-V33	
C16	220			SI220	D6-221	TP39	GP1K-221	UC-5322	5GA-T22	
C17	.05	200		P288-05	DF-503	PJ2S5		PT415	2TM-S5	
C18	.01	400		P488-01	D6-103	CUB4S1		PT411	4TM-S1	
C19	47			SI47	D6-470	TP29	GP1K-470	UC-5447	5GA-Q47	
C20	5000			BPD-005	DD-502	K080	801-005	DC-525	5HK-D5	
C21	1000			BPD-001	DD-102	K069	801-001	DC-521	5HK-D1	
C22	5000			BPD-005	DD-502	K080	801-005	DC-525	5HK-D5	
C23	10000			BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C24	5000			BPD-005	DD-502	K080	801-005	DC-525	5HK-D5	
C25	.05	200		P288-05	DF-503	PJ2S5		PT415	2TM-S5	
C26	22	500		1468-000025		5W5Q22		MCE220	MS-42	
C27	5000			BPD-005	DD-502	K080	801-005	DC-525	5HK-D5	
C28	10000			BPD-01	DD-103	K082	811-01	DC-511	5HK-S1	
C29	5000			BPD-005	DD-502	K080	801-005	DC-525	5HK-D5	
C30	100			SI100	D6-101	TP34	GP1K-101	UC-531	5GA-T1	
C31	100			SI100	D6-101	TP34	GP1K-101	UC-531	5GA-T1	
C32	100			SI100	D6-101	TP34	GP1K-101	UC-531	5GA-T1	
C33	.003	600		P688-003	D6-302	CUB6D3	GP2-333-302	PT623	6TM-D3	
C34	.01	400		P488-01	D6-103	CUB4S1		PT411	4TM-S1	
C35	220			SI220	D6-221	TP39	GP2K-221	UC-5322	5GA-T22	
C36	100			SI100	D6-101	TP34	GP1K-101	UC-531	5GA-T1	
C37	.02	400		P488-02		CUB4S2		PT412	4TM-S2	
C38	.25	200		P288-25		PJ2P25		PT4025	2TM-P25	
C39	5000			BPD-005	DD-502	K080	801-005	DC-525	5HK-D5	Note 1
C40	.01	400		P488-01	D6-103	CUB4S1	GP2-333-103	PT411	4TM-S1	Note 1
C41	.01	400		P488-01	D6-103	CUB4S1	GP2-333-103	PT411	4TM-S1	Note 1

Note 1. Not used in all models.

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	Silvertone PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	
R1A	500KΩ	½	N41061				U-48	Volume
B	Switch		Not Req.				US-26	Attach to R1A

CHASSIS—TOP VIEW



PROPERTY OF
L. F. [illegible]KENSHIP
392[illegible] WADE ST.
[illegible], COLORADO

PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS

ITEM No.	RATING OHMS	RATING WATT	REPLACEMENT DATA Silvertone PART No.	REPLACEMENT DATA IRC PART No.	NOTES
R2	1Meg	½		BTS-1Meg	
R3	180Ω	½		BTS-180	
R4	6800Ω	1		BTA-6800	
R5	2200Ω	½		BTS-2200	
R6	10KΩ	½		BTS-10K	
R7	1000Ω	½		BTS-1000	
R8	10KΩ	½		BTS-10K	
R9	1000Ω	½		BTS-1000	
R10	1Meg	½		BTS-1Meg	
R11	22KΩ	½		BTS-22K	
R12	8200Ω	1		BTA-8200	
R13	1Meg	½		BTS-1Meg	
R14	68Ω	½		BTS-68	
R15	10KΩ	1		BTA-10K	
R16	1000Ω	½		BTS-1000	
R17	68Ω	½		BTS-68	
R18	3300Ω	1		BTA-3300	
R19	1000Ω	½		BTS-1000	
R20	180Ω	½		BTS-180	
R21	39KΩ	½		BTS-39K	
R22	15KΩ	½		BTS-15K	
R23	1Meg	½		BTS-1Meg	
R24	10Meg	½		BTS-10Meg	
R25	220KΩ	½		BTS-220K	
R26	270Ω	½		BTS-270	
R27	2700Ω	½		BTS-2700	
R28	10Meg	½		BTS-10Meg	
R29	470KΩ	½		BTS-470K	
R30	470KΩ	½		BTS-470K	
R31	270Ω	1		BTA-270	
R32	120Ω	1			
R33	1000Ω	10			

TRANSFORMER (POWER)

ITEM No.	RATING PRI.	RATING SEC. 1	RATING SEC. 2	RATING SEC. 3	REPLACEMENT DATA Silvertone PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Halldorson PART No.	Thordarson PART No.
T1	117VAC @.36A	380VCT .050ADC	6.3VAC @3.5A		N-22959					

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE PRI.	IMPEDANCE SEC.	REPLACEMENT DATA Silvertone PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Halldorson PART No.	Thordarson PART No.	NOTES
T2	4.8KΩ	3.6Ω	N-23669-1	A-3877	A-2930	S-3X	Z1000	TS-24S51	

SPEAKER

ITEM No.	RATINGS SIZE	RATINGS FIELD	RATINGS V. C. IMP.	REPLACEMENT DATA Silvertone PART No.	VIKING PART No.	QUAM PART No.	NOTES
SP1	5 x 7"	PM	3.6Ω	N-24817	57J9	57A1	

COILS (RF-IF)

ITEM No.	USE	DC RES. PRI.	DC RES. SEC.	REPLACEMENT DATA Silvertone PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	NOTES
L1	FM Ant. Coil	.1Ω		N22648-1	19-1001		4604	1.5 Microhenries
L2	FM RF Choke	.7Ω		N21445-1	19-1004		4610	7.5 Microhenries
L3	Fil. Choke	.7Ω		N21673	19-1005		4624	14 Microhenries
L4	FM RF Coil	0Ω		N22593-1				
L5	FM Osc. Coil	0Ω		N22594-1				
L6	Cathode Choke	.5Ω		N22597-1	19-1002		4606	3 Microhenries
L7	AM Loop Ant.	.3Ω	2.6Ω	N24770				
L8	AM Ant. Loading Coil	.6Ω		N24772-1	19-1004		4610	8 Microhenries
L9	AM Osc. Coil	.6Ω	7Ω	N22587-1	14-1074	BC-381 †	70-Osc.	
L10	Parasitic Suppressor	0Ω		N22334-1				
L11	1st. FM IF	1.1Ω	1.1Ω	N40690	16-3487 *	FM-251	1451	
L12	1st. AM IF	10Ω	10Ω	N24771	16-6758 *	BC-352 *	1312-C1	
L13	2nd. FM IF	.3Ω	.5Ω	N40614-1				
L14	2nd. AM IF	10Ω	10Ω	N24771	16-6758 *	BC-353 *	1312-C4	
L15	Ratio Det.	.9Ω	.1ΩCT	N22592-1	17-3487	FM-255 *	1465 *	Tertiary winding-.25Ω

† Drill mounting hole.
* Use adaptor plate.

PARTS LIST AND DESCRIPTIONS (Continued)

PHONO CARTRIDGE

ITEM No.	Silvertone PART No.	ASTATIC PART No. CARTRIDGE	ASTATIC PART No. NEEDLE	SHURE PART No. CARTRIDGE	SHURE PART No. NEEDLE	ELECTRO-VOICE PART No. CARTRIDGE	ELECTRO-VOICE PART No. NEEDLE	REMARKS
M1		GC-AG-J	G-AG	WC36B	A56U	43	0-2 or S-2	

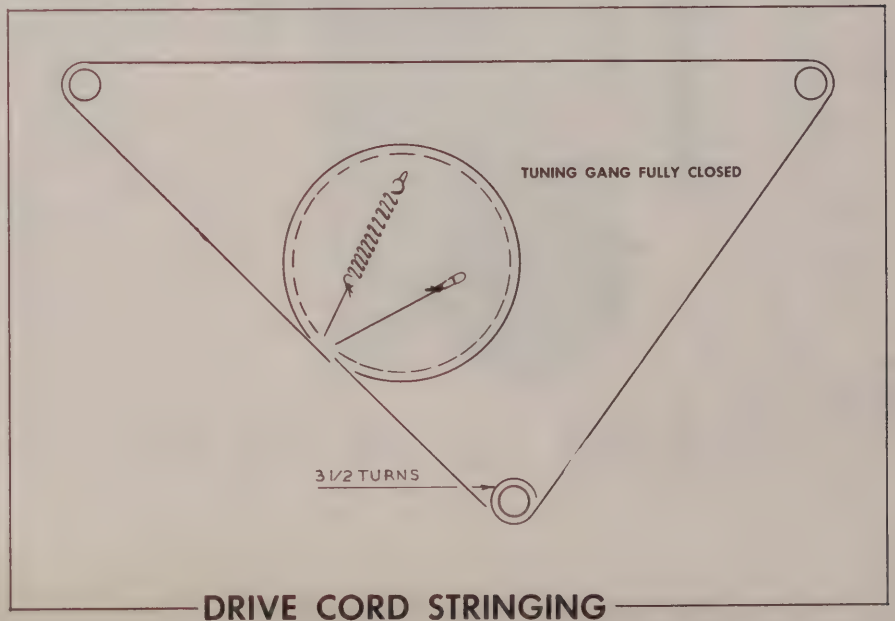
PHONO NEEDLE

(FOR REPLACEMENT IN ORIGINAL EQUIPMENT CARTRIDGE)

ITEM No.	Silvertone PART No.	JENSEN PART No.	PERMO PART No.	WALCO PART No.	REMARKS
M4		†S-642 or *S-652	*B-326 or †B-334 or ♦B-334D	*W-3AGA or †W-3AGS	* Metal † Jewel ♦ Diamond

MISCELLANEOUS

ITEM No.	PART NAME	Silvertone PART No.	NOTES
M3	Dial Light	N19351	#47 Bayonet
M4	Tuning Cap.	N41060	36-535 & 17-133 MMF
M5	Switch	N40722	Function
A12	Trimmer Cap.	N22724	5-25MMF - Osc. Temp. correction
	Knob	N40799-3	Function Switch
	Knob	N40799-1	Tuning and volume



DRIVE CORD STRINGING

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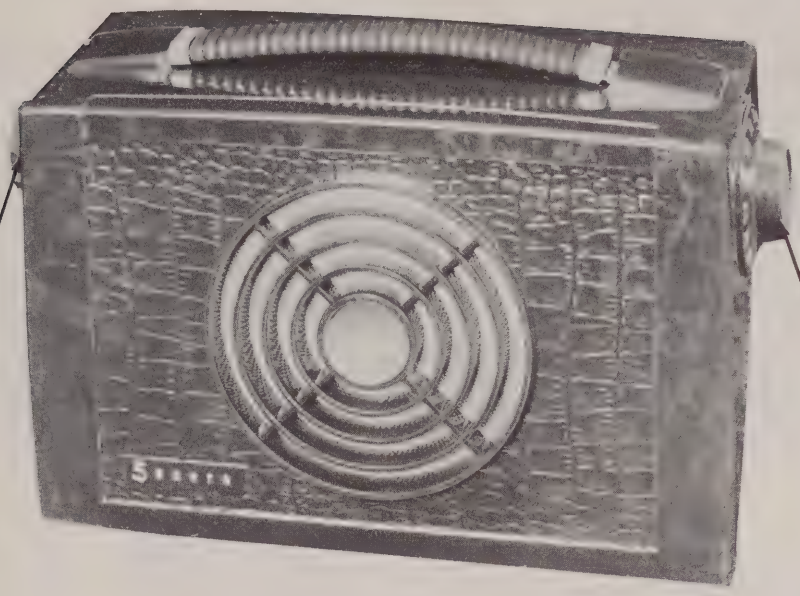
3924 MEADE ST.
DENVER, COLORADO

SONORA
MODELS 335, 336



SONORA
MODELS 335, 336

TRADE NAME	Sonora Models 335, 336
MANUFACTURER	Sonora Radio & Tel. Corp. N. Hoyne Ave., Chicago, Ill.
TYPE SET	Three Power Portable AM Superheterodyne Receiver
TUBES (Four)	Types 1R5 Conv., 1U4 IF Amp., 1U5 Det. -AVC-AF Amp., 3V4 Audio Output
POWER SUPPLY RATINGS	110-120 Volts AC-DC (or) 4½ Volts "A" Supply & 90 Volts "B" Supply .14 Amp. @ 117 Volts AC (or) 100MA @ 4.5 Volts DC & 16MA @ 90 Volts DC
TUNING RANGE—BROADCAST	535-1620KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

To set pointer, turn tuning capacitor fully closed and set pointer to last reference mark at low frequency end of dial.
Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.
Use battery power, if possible. If AC power is used, use an isolation transformer when available. If not, connect a .1MFD capacitor in series with low side of the signal generator and B-.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.05MFD	High side to antenna stator lug on tuning gang. Low side to B-.	455KC (400~ Mod)	Tuning gang fully open	Across voice coil	A1, A2 A3	Adjust for maximum output. If AC power is used without an isolation transformer, reduce dummy antenna to 200MMF to reduce hum modulation.
2.		Loop	1620KC	"	"	A4	Fashion loop of several turns of wire and radiate signal into loop of receiv receiver. Adjust for maximum output.
3.		"	1400KC	Tune to 1400KC signal	"	A5	Fashion loop of several turns of wire and radiate signal into loop of receive receiver. Adjust for maximum output.
4.		"	600KC	Tune to 600KC signal	"	A6	Adjust for maximum output. Repeat steps 2 and 3.

"The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed."
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PARTS LIST AND DESCRIPTIONS

SONORA MODEL 335

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA: SONORA PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RETMA BASE TYPE	NOTES
V1	Converter	1R5	1R5	7AT	
V2	IF Amplifier	1U4	1U4	6AR	
V3	Det-AVC-AF Amp.	1U5	1U5	6BW	
V4	Audio Output	3V4	3V4	6BX	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING CAP.	RATING VOLT	SONORA PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C1A	▲ 50	150	N-6841	AFH4-34		D028		FP229. 6 TCD47	R1367	
B	■ 30	150								
C	▲ 30	150								
D	100	25								
C2	05	200	N-1345	P288-05	DF-503	PJ2S5		PT415	2TM-S5	
C3	50		N-6375	SI50	D6-500	TP30	GP1K-500	UC-545	5GA-Q5	
C4	005	600	N-4894	P688-005	D6-502	CUB6D5	801-005	DC-525	5HK-D5	
C5	.1Ω	200	N-1351	P288-1	DF-104	PJ2P1		PT400	2TM-P1	
C6	002	600	N-6377	P688-002	D6-202	CUB6D2	GP2-333-202	PT622	6TM-D2	
C7	100		N-6015	SI100	D6-101	TP34	GP1K-101	UC-531	6GA-T1	
C8	005	600	N-4894	P688-005	D6-502	CUB6D5	801-005	DC-525	5HK-D5	
C9A	100							UC-531		
B	5000		♦ N-8330	♦ PA-117	♦ PC-91	♦ 114TM2	♦ 1407-03	DC-525	♦ P-2	
C	5000							DC-525		
C10	002	600	N-6377	P688-002	D6-602	CNB-6D2	GP2-333-202	PT622	6TM-D2	
C11	. 05	400	N-1346	489ZX-05	DF-503	PJ4S5		PT415	4TM-S5	
C12	05	200	N-1345	P288-05	DF-503	PJ2S5		PT415	2TM-S5	

♦ Items C9A, C9B, C6C, R8A, R8B and R8C are combined in one unit.

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	SONORA PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	1 Meg	½	N-8332	Q13-137	A47-1 Meg-Z	BSK-70-S	U-53	Volume
B	Shaft		Not Req.	Not Req.	KSS-3	Not Req.	Not Req.	Attach to R1A
C	Switch		Not Req.	76-2	SWE-20	Not Req.	US-27	Attach to R1A

RESISTORS

ITEM No.	RATING OHMS	RATING WATT	SONORA PART No.	IRC PART No.	NOTES
R2	100KΩ	½	N-1973	BTS-100K	
R3	22KΩ	½	N-6012	BTS-22K	
R4	6. 8Meg	½	N-4028	BTS-6. 8 Meg	
R5	4. 7 Meg	½	N-4061	BTS-4. 7 Meg	
R6	470Ω	½	N-4066	BTS-470	
R7	6. 8 Meg	½	N-4028	BTS-6. 8 Meg	
R8A	4. 7 Meg	½		BTS-4. 7 Meg	
B	1 Meg	½	♦ N-8330	BTS-1 Meg	
C	2. 2 Meg	½		BTS-2. 2 Meg	

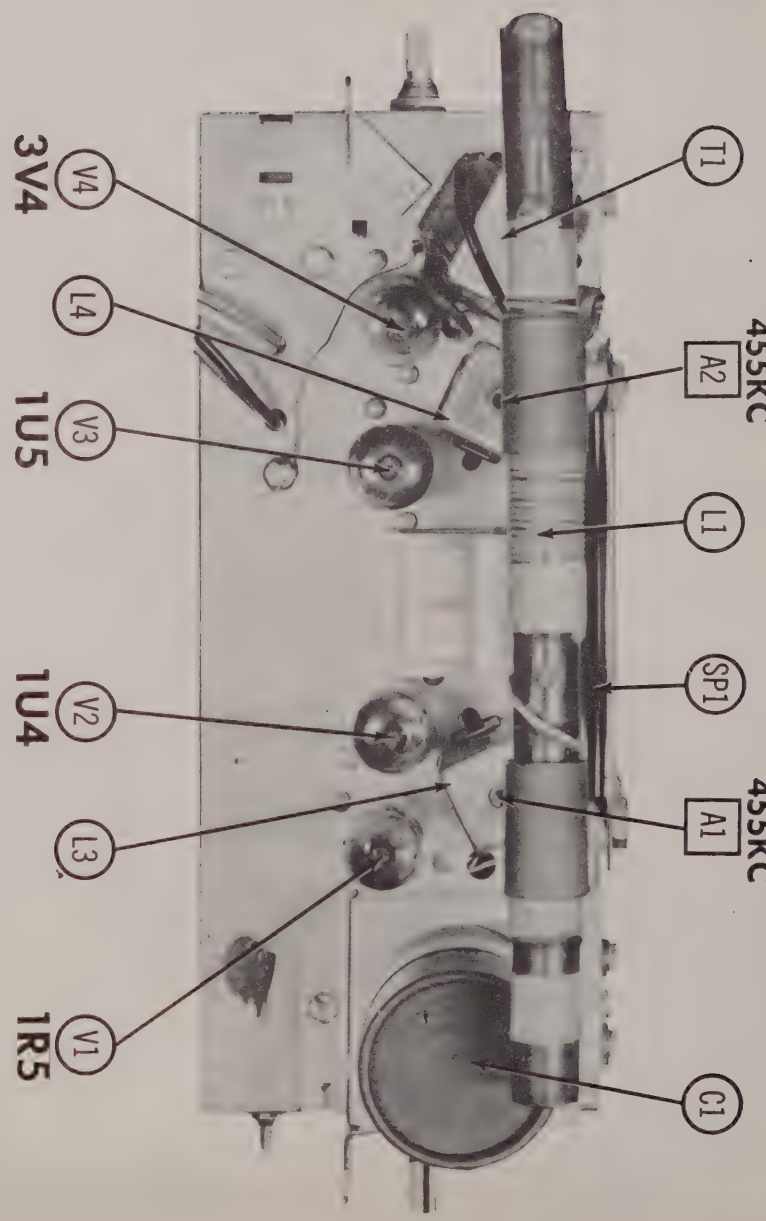
ITEM No.	RATING OHMS	RATING WATT	SONORA PART No.	IRC PART No.	NOTES
R9	1200Ω	½	N-6793	BTS-1200	
R10	27Ω	½	N-6792	BTS-27	
R11	1200Ω	½	N-6793	BTS-1200	
R12	220KΩ	½	N-4026	BTS-220K	
R13	330Ω	½	N-4420	BTS-330	
R14	82Ω	2	N-4023		
R15	2200Ω	½	N-4896	BTS-2200	
R16A	1150Ω 5%	5. 6	N-8333		
B	1150Ω 5%				

♦ Items R8A, R8B, R8C, C9A, C9B, C9C are combined in one unit.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE PRI.	IMPEDANCE SEC.	SONORA PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Halldorson PART No.	Thordarson PART No.	NOTES
T1	9. 8KΩ	3. 7Ω	N-8329	A-3329	A-2927 ①	S-11X	Z1110	TS-24S49	① Drill one new mounting hole.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

SPEAKER

ITEM No.	RATINGS			REPLACEMENT DATA			NOTES
	SIZE	FIELD	V. C. IMP.	SONORA PART No.	JENSEN PART No.	QUAM PART No.	
SP1	4"	PM	3.7Ω	N-6681	ST-113 Mod P4-X	4A07	

COILS (RF-IF)

ITEM No.	USE	DC RES.		REPLACEMENT DATA				NOTES
		PRI.	SEC.	SONORA PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L1	Ant. Coil	.3Ω		N-8328				
L2	Osc. Coil	1.4Ω	5.5Ω	N-8327	14-1074	BC-381	71-Osc.	
L3	Input IF	15Ω	20Ω	N-7981	16-6758	BC-352	12-C1	
L4	Output IF	25Ω	25Ω	N-8326	16-6758	BC-353	12-C2	

SELENIUM RECTIFIER

ITEM No.	RATING	REPLACEMENT DATA						NOTES
	CURRENT	SONORA PART No.	FEDERAL PART No.	INTERNATIONAL PART No.	MALLORY PART No.	SARKES TARZIAN PART No.	SELETRON PART No.	
M1	.064A	N8331	1002A	RS-65	6S65	65	5M4	

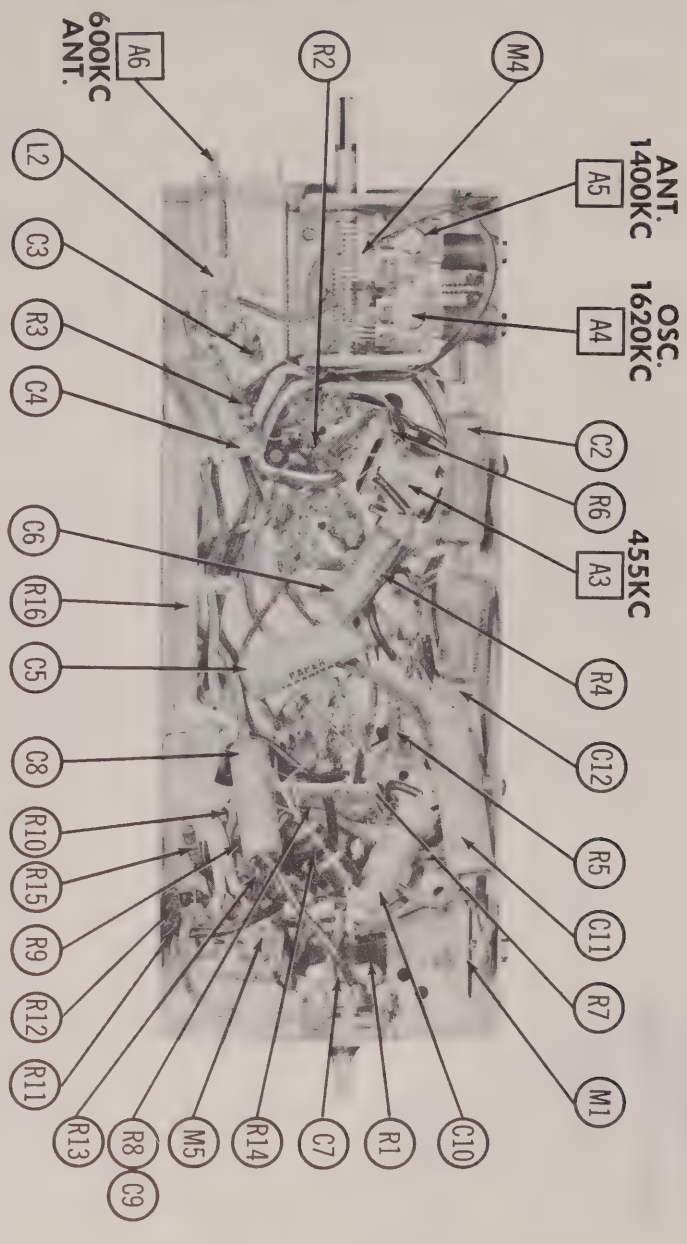
BATTERIES

ITEM No.	VOLTAGE	SONORA PART No.	REPLACEMENT DATA						INSTALLATION NOTES
			EVEREADY			BURGESS			
			"A"	"B"	"A-B"	"A"	"B"	"A-B"	
M2	$4\frac{1}{2}$ V		736			F3			
M3	90V			490			N-60		

MISCELLANEOUS

ITEM No.	PART NAME	SONORA PART No.	NOTES
M4	Tuning cap	N-8321	(10-290MMF) (15-120MMF)
M5	Switch	N-5951	Power changeover

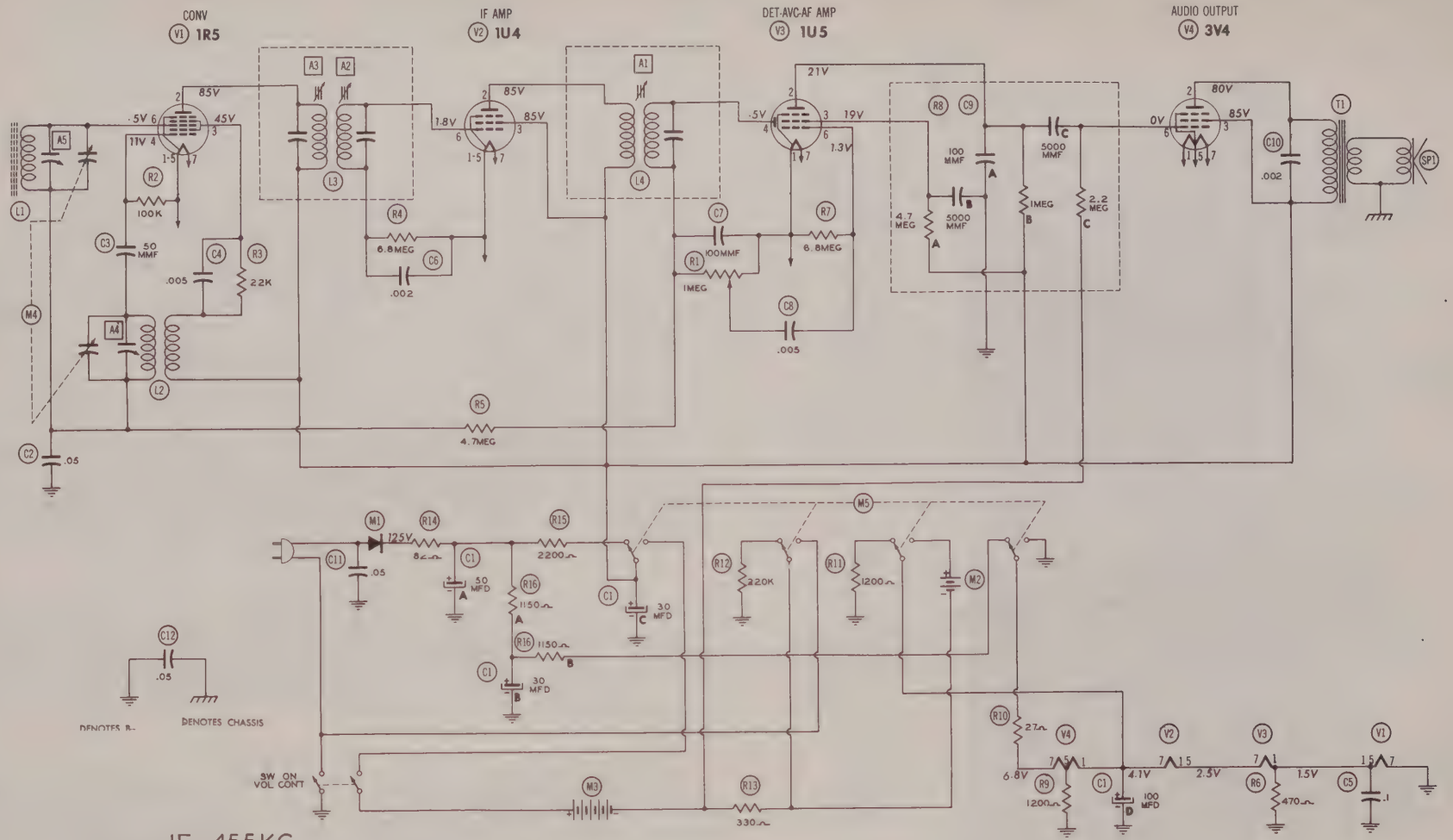
CHASSIS—BOTTOM VIEW



SET 250 FOLDER 19

SONORA MODEL 335

SONORA MODEL 335



IF=455KC

THE COOPERATION OF THE MANUFACTURER OF THIS RECEIVER MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V-1	1R5	*	↑ 2.3KΩ	↑ 24KΩ	100KΩ	*	5.7 Meg	0Ω
V-2	1U4	*	↑ 2.3KΩ	↑ 2.3KΩ	INF	*	6.8 Meg	*
V-3	1U5	*	↑ 1 Meg	↑ 4.7 Meg	1 Meg	1 Meg	6.8 Meg	*
V-4	3V4	*	↑ 2.8KΩ	↑ 2.3KΩ	330Ω	*	2.2 Meg	*

* DO NOT USE OHMMETER TO MEASURE FILAMENT RESISTANCE
↑ MEASURED FROM OUTPUT OF M1.

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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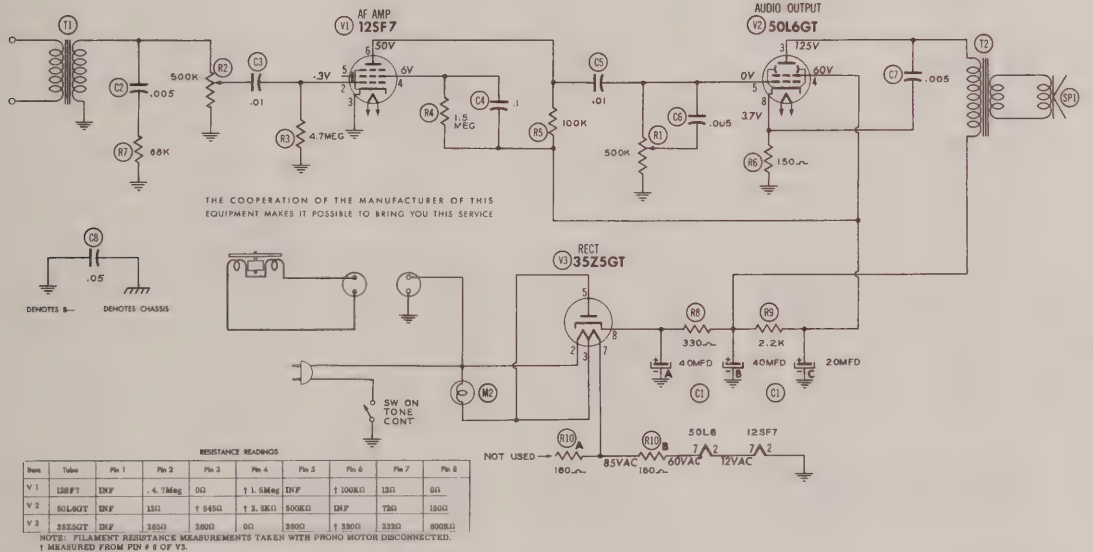
PROPERTY OF
L. F. DUNNEBIER
2801 MEADE ST.
DENVER, COLORADO

STEELMAN
MODEL 3A2

TRADE NAME	Steelman Model 3A2
MANUFACTURER	Steelman Phono & Radio Co., Inc., 12-30 Anderson Ave., Mt. Vernon, N. Y.
TYPE SET	AC Operated Phono Amplifier with 3 Speed Automatic Record Changer
TUBES (Three)	Types 12SF7 AF Amp., 50L6GT Audio Output, 35Z5GT Rectifier
POWER SUPPLY	110-120 Volts AC-60 Cycles
RATING	.22 Amp. @ 117 Volts AC

FOR SERVICE INFORMATION ON RECORD CHANGER UNIT-SEE COLLARO MODEL 3RC. 522-PHOTOFACT SET # 205 FOLDER # 4 OR RECORD CHANGER MANUAL CM-5.



RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
V 1	12SF7	INF	. 4. 7Meg	0Ω	† 1. 5Meg	INF	† 100KΩ	12Ω	0Ω
V 2	50L6GT	INF	13Ω	† 545Ω	† 3. 8KΩ	500KΩ	INF	72Ω	150Ω
V 3	35Z5GT	INF	285Ω	380Ω	0Ω	260Ω	† 330Ω	233Ω	600KΩ

NOTE: FILAMENT RESISTANCE MEASUREMENTS TAKEN WITH PHONO MOTOR DISCONNECTED.
† MEASURED FROM PIN # 8 OF V3.

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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250-20

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PARTS LIST AND DESCRIPTIONS

STEELMAN MODEL 3A2

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA: STEELMAN PART No.	REPLACEMENT DATA: STANDARD REPLACEMENT	RETMA BASE TYPE	NOTES
V1	AF Amplifier	12SF7	12SF7	7AZ	
V2	Audio Output	50L6GT	50L6GT	7S	
V3	Rectifier	35Z5GT	35Z5GT	6AD	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	RATING: VOLT	REPLACEMENT DATA: STEELMAN PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C1A	■ 40	150	CF1001	AFH-309		C008		FP311. 5	TVL-3440	
B	▲ 40	150								
C	20	150								
C2	.005	600		P688-005	D6-502	PTE605	GP2-333-502	PT625	6TM-D5	
C3	.01	600		P688-01	D6-103	PTE-6S1	GPT-333-103	PT611	6TM-S1	
C4	.1	200		P288-1	DF-104	PJ2P1		PT401	2TM-P1	
C5	.01	600		P688-01	D6-103	PTE6S1	GPT-333-103	PT611	6TM-S1	
C6	.005	600		P688-005	D6-502	PTE6D5	GP2-333-502	PT625	6TM-D5	
C7	.005	600		P688-005	D6-502	PTE6D5	GP2-333-502	PT625	6TM-D5	
C8	.05	400		P488-05		PTE4S5		PT-415	4TM-S5	

CONTROLS

ITEM No.	RATING: RESISTANCE	RATING: WATTS	REPLACEMENT DATA: STEELMAN PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	500KΩ	½	34-011-722	Q13-133	A47-500K-Z	BSK-60-S	U-48	Tone
B	Shaft		Not Req.	Not Req.	KSJ-3	Not. Req.	Not Req.	Attach to R1A
C	Switch		Not Req.	76-1	SWE-12	Not Req.	US-26	Attach to R1A
R2A	500KΩ	½	VC-25	Q13-133	A47-500K-Z	B-60	U-48	Volume
B	Shaft		Not Req.	Not Req.	FS-3	Not Req.	Not Req.	Attach to R2A

RESISTORS

ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: STEELMAN PART No.	IRC PART No.	NOTES
R3	4. 7 Meg	½		BTS-4. 7Meg	
R4	1. 5Meg	½		BTS-1. 5Meg	
R5	100KΩ	½		BTS-100K	
R6	150Ω	1		BTA-150	
R7	68KΩ	½		BTS-68K	

ITEM No.	RATING: OHMS	RATING: WATT	REPLACEMENT DATA: STEELMAN PART No.	IRC PART No.	NOTES
R8	330Ω	1		BTA-330	
R9	2200Ω	1		BTA-2200	
R10A	160Ω	10			
B	160Ω				

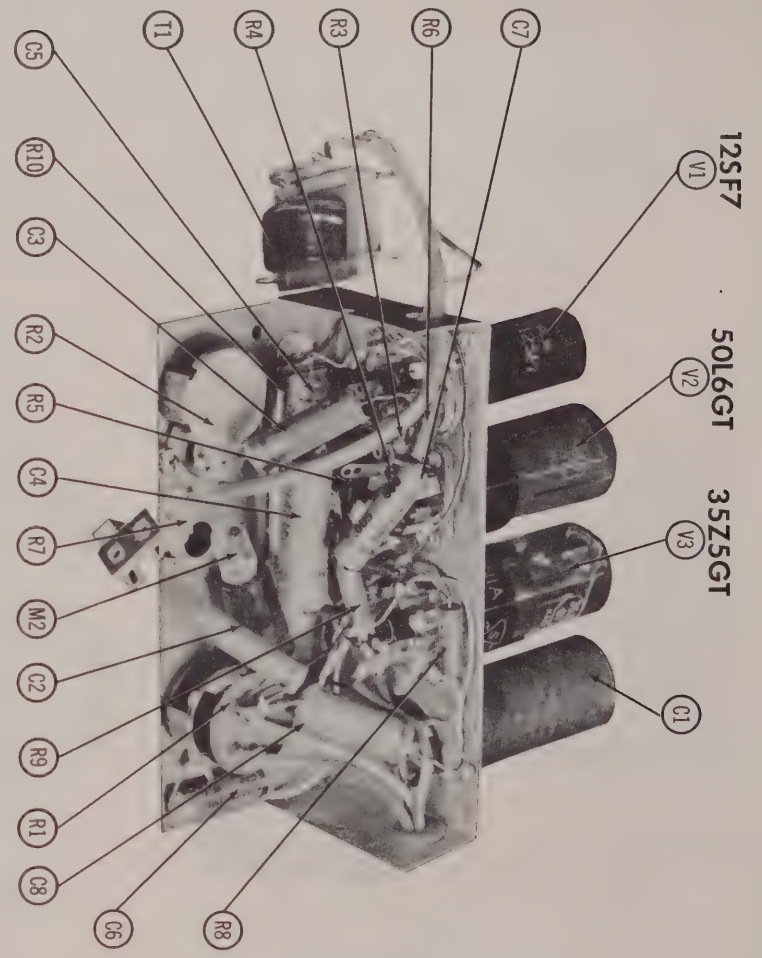
TRANSFORMER (INPUT)

ITEM No.	RATING: PRI.	RATING: SEC. 1	RATING: SEC. 2	RATING: SEC. 3	REPLACEMENT DATA: STEELMAN PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Halldorson PART No.	Thordarson PART No.
T1	1. 43Ω	2. 85KΩ								
	Turns Ratio 94 to 1									

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE: PRI.	IMPEDANCE: SEC.	REPLACEMENT DATA: STEELMAN PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Halldorson PART No.	Thordarson PART No.	NOTES
T2	2. 5KΩ	3. 2Ω		A-3876 ①	A2928 ①	S-1X ①	Z1001 ①	24S50 ①	① Bend tabs down, file out slots, mount on original mounting bracket.

CHASSIS—BOTTOM VIEW



SPEAKER

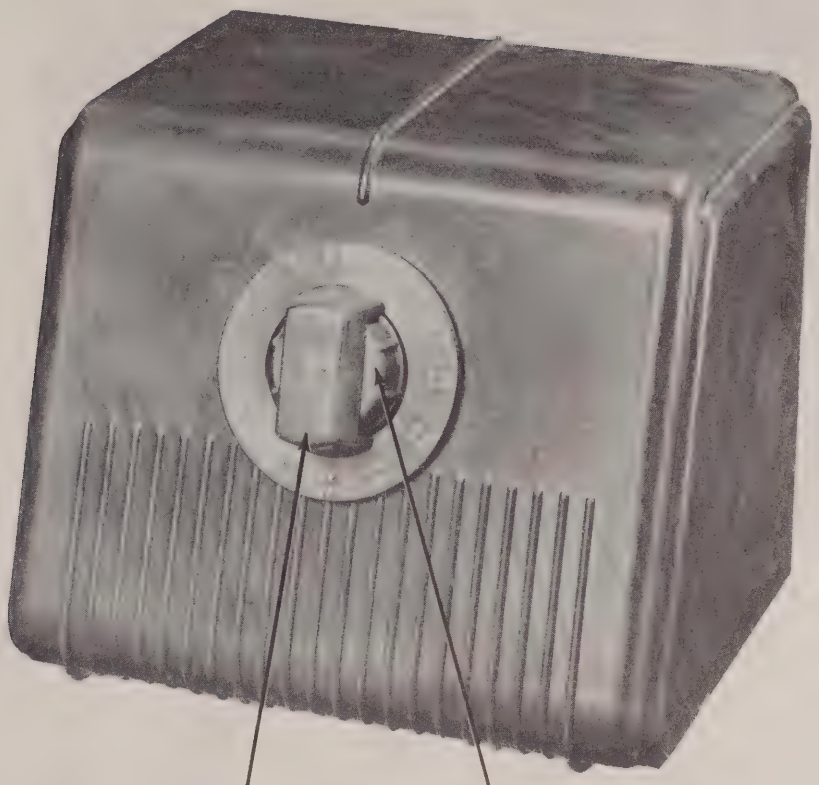
ITEM No.	RATINGS: SIZE	RATINGS: FIELD	RATINGS: V. C. IMP.	REPLACEMENT DATA: STEELMAN PART No.	JENSEN PART No.	QUAM PART No.	NOTES
SP1	6"	PM	3. 2Ω	SP-60	ST-108 Mod. P6-X	6A1	

MISCELLANEOUS

ITEM No.	PART NAME	STEELMAN PART No.	NOTES
M1	Phono Cartridge		
M2	Pilot Lamp		Type # 47

PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST
DENVER, COLORADO

SUTCO
MODEL 37A (UHF Conv.)



SUTCO
MODEL 37A (UHF Conv.)

TRADE NAME	Sutco Model 37A		
MANUFACTURER	Sutton Electronic Co., Inc., 426 W. Short St., Lexington, Ky.		
TYPE SET	AC Operated All Channel UHF Converter		
TUBES (One)	Type 6T4 Oscillator		
POWER SUPPLY	110-120 Volts AC	RATING	.1 Amp. @ 117 Volts AC
TUNING RANGE	Channels 14 thru 83		

THIS UNIT HAS BEEN PRE-ALIGNED AT THE FACTORY AND IS VERY STABLE. ALIGNMENT SHOULD NOT BE ATTEMPTED IN THE FIELD.

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PARTS LIST AND DESCRIPTIONS

SUTCO MODEL 37A

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA		RETMA BASE TYPE	NOTES
		SUTCO PART No.	STANDARD REPLACEMENT		
V1	Oscillator	6T4	6T4	6DK	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	SUTCO PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C1A	▲ 125	150		AFHS2-110		XB006		FP215	R1526	
B	▲ 100	150								
C2	.7									
C3	.7									
C4	1			SH	TCZ-1	TX03	NPOK-1		5TCCB-V1	
C5	2.5									
C6	15			SH15	TCZ-15	TZ11	NPOK-150		5TCU-Q15	
C7	L7									
C8	L7									
C9	.05	400		P488-05	DF-503	CUB4S5		PT415	4TM-35	

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	SUTCO PART No.	IRC PART No.	
R1	1500Ω	½		BTS-1500	
R2	1500Ω	½		BTS-1500	
R3	12KΩ	½		BTS-12K	
R4	1000Ω	½		BTS-1000	

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	SUTCO PART No.	IRC PART No.	
R5	56Ω	1			
R6	680Ω	1		BTA-680	
R7	47KΩ	½		BTS-47K	
R8	47Ω	½		BTS-47	

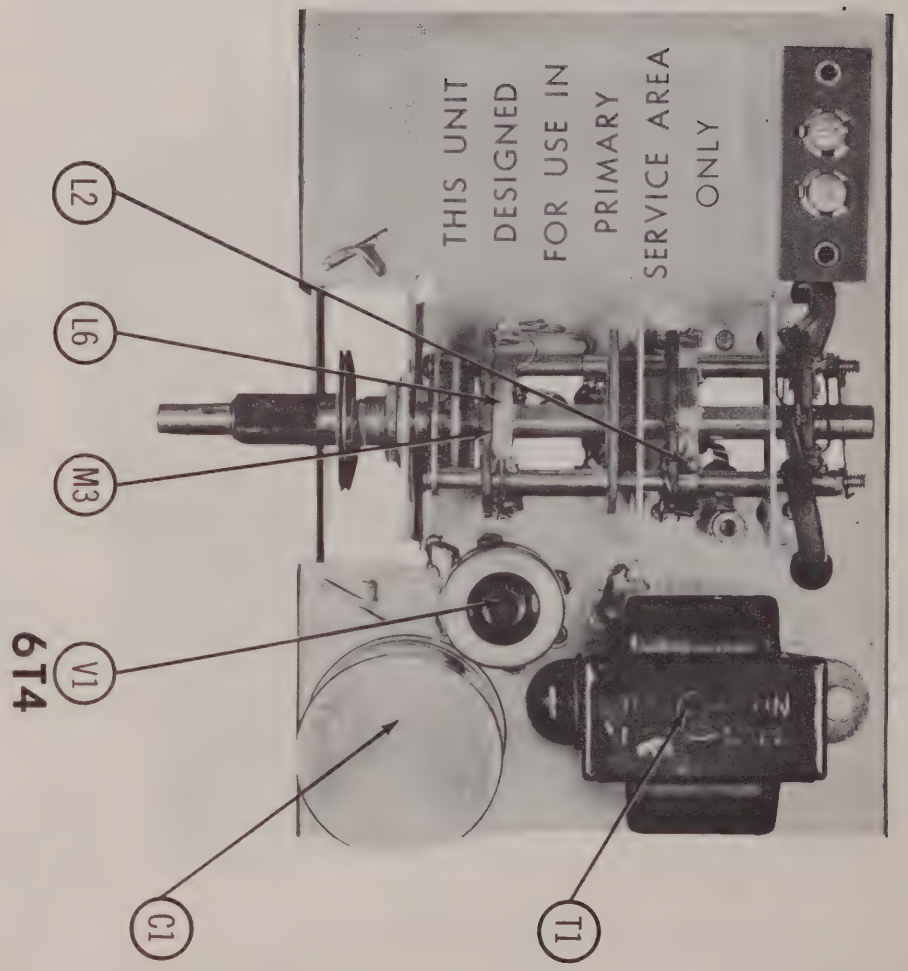
TRANSFORMER (POWER)

ITEM No.	RATING				REPLACEMENT DATA					
	PRI.	SEC. 1	SEC. 2	SEC. 3	SUTCO PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Halldorson PART No.	Thordarson PART No.
T1	117VAC @ 1A	125V .018A Tap @ 6.3V .23A			53426	PS-8415	P-3046		P9100	26R32

COILS (RF-IF)

ITEM No.	USE	DC RES.		REPLACEMENT DATA				NOTES
		PRI.	SEC.	SUTCO PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L1	UHF Ant. Coil	0Ω						
L2	UHF Ant. Coil	0Ω						
L3	Fil. Choke	.2Ω						
L4	Fil. Choke	.2Ω						
L5	Cathode Choke	.1Ω						
L6	UHF Osc. Coils	0Ω						
L7	UHF IF Coupling	0Ω						
L8	UHF IF Output Coil	0Ω	0Ω					

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

SELENIUM RECTIFIER

ITEM No.	RATING	REPLACEMENT DATA						NOTES
	CURRENT	SUTCO PART No.	FEDERAL PART No.	INTERNATIONAL PART No.	MALLORY PART No.	SARKES TARZIAN PART No.	SELETRON PART No.	
M1	.018A			CR20 ①	8S20	35	8Y1	① Mounting difference

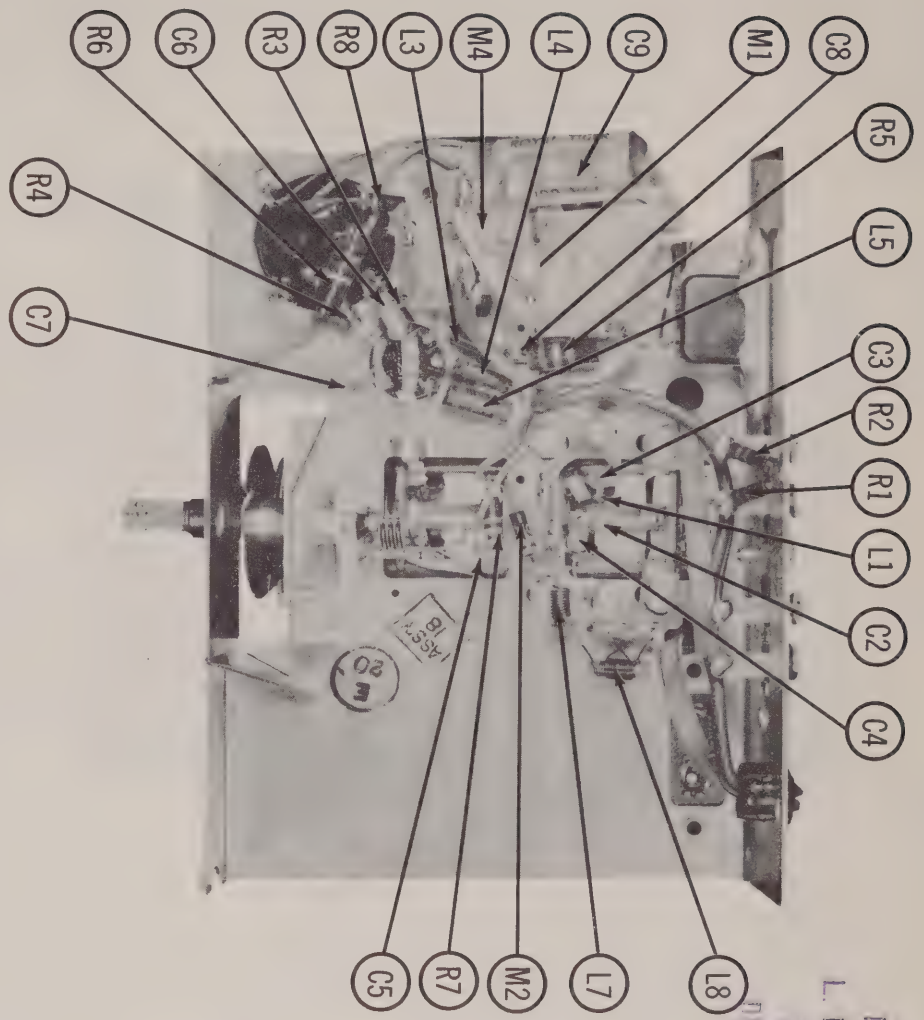
CRYSTAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA			NOTES
		SUTCO PART No.	SYLVANIA PART No.	FEDERAL PART No.	
M2	CK710		1N82 or A		UHF Mixer

MISCELLANEOUS

ITEM No.	PART NAME	SUTCO PART No.	NOTES
M3	Switch		VHF-UHF channel selector
M4	Switch		Thermal-power off-on
	Trimmer cap	9M11	Air core-fine tuning

CHASSIS—BOTTOM VIEW



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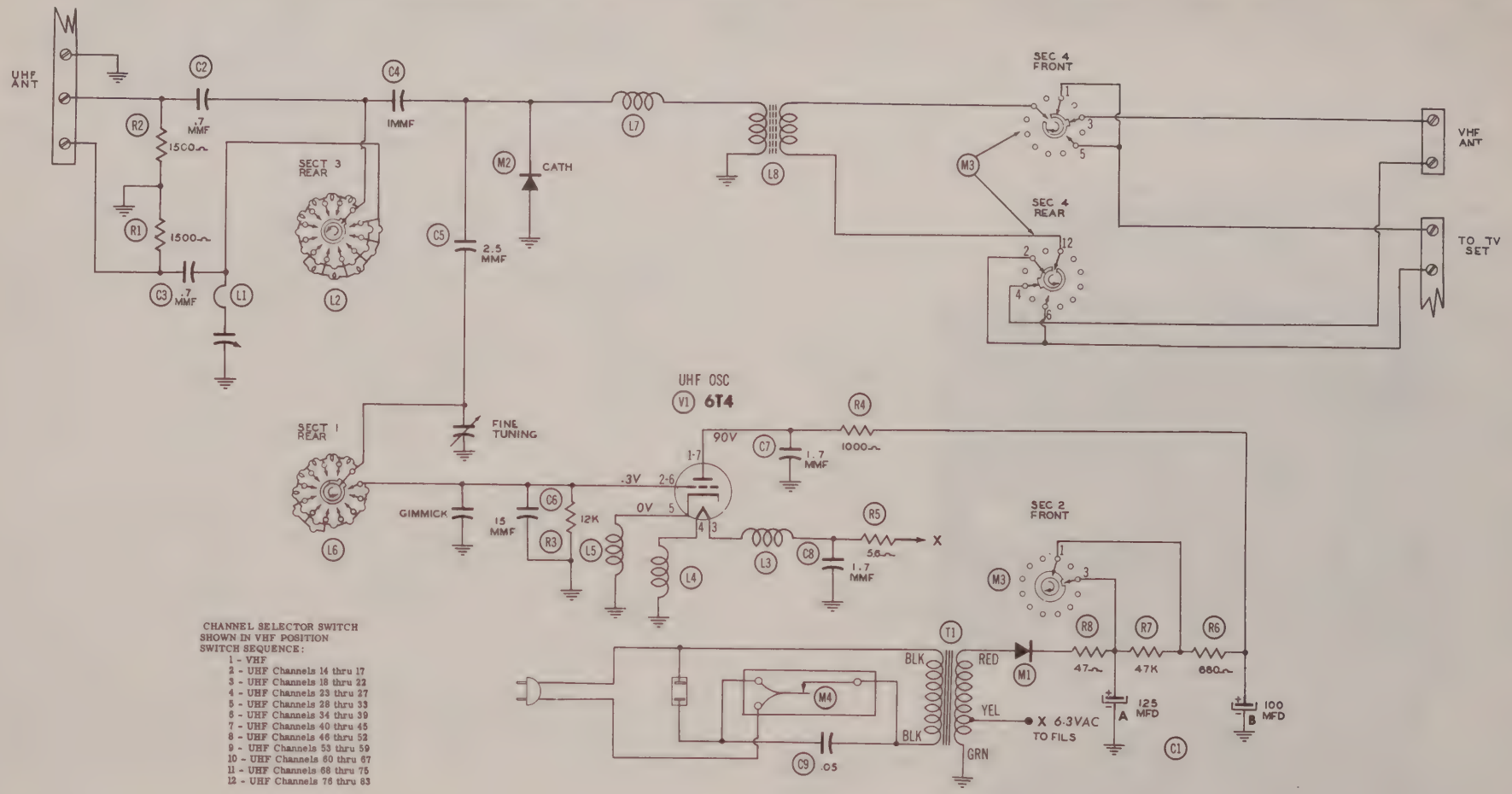
L. F. SLANKENSHIP

SUTCO MODEL 37A



CHANNEL SELECTOR SWITCH SHOWN IN VHF POSITION

SWITCH SEQUENCE:

1 - VHF
2 - UHF Channels 14 thru 17
3 - UHF Channels 18 thru 22
4 - UHF Channels 23 thru 27
5 - UHF Channels 28 thru 33
6 - UHF Channels 34 thru 39
7 - UHF Channels 40 thru 45
8 - UHF Channels 46 thru 52
9 - UHF Channels 53 thru 59
10 - UHF Channels 60 thru 67
11 - UHF Channels 68 thru 75
12 - UHF Channels 76 thru 83

THE COOPERATION OF THE MANUFACTURER OF THIS EQUIPMENT MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

Pin No.	6T4 Res.
1	† 49KΩ
2	12KΩ
3	.3Ω
4	.2Ω
5	.1Ω
6	12KΩ
7	† 49KΩ

† MEASURED FROM OUTPUT OF M1.

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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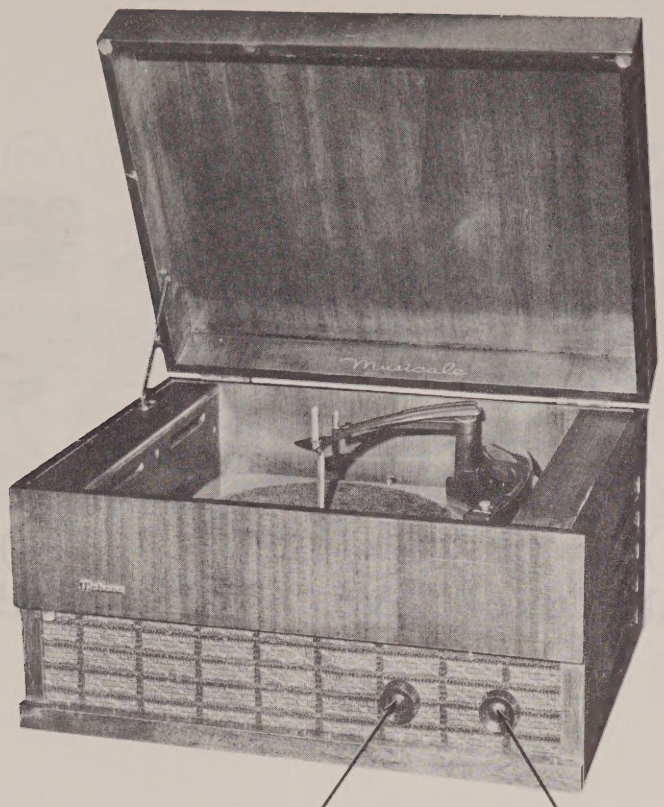
WEBCOR
MODELS 333-1, 333-2

PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO

WEBCOR
MODELS 333-1, 333-2



WEBCOR
MODELS 333-1, 333-2

TRADE NAME	Webcor Models 333-1,333-2 "Musicale"
MANUFACTURER	Webster-Chicago Corp., 5610 Bloomingdale Ave., Chicago 39, Ill.
TYPE SET	AC Operated 5 Watt Amplifier with 3 Speed Automatic Record Changer
TUBES (Five)	Types 12AX7 Pre. Amp., 12AT7 AF Amp. - Phase Inv., (2) 6V6GT Audio Ouput, 6X5 Rectifier
POWER SUPPLY	110-120 Volts AC-60 cycles RATING .31 Amp. @ 117 Volts AC

DISASSEMBLY INSTRUCTIONS

1. Remove 4 wood screws holding bottom cover.
2. Remove phono motor and phono pickup plugs from amplifier.
3. Remove "C" washer from bottom of record changer rear mounting bolt.
4. Remove retaining ring that secures turntable to record changer. Remove turntable by lifting straight up and off the spindle.
5. Insert index finger through round hole near front of changer baseplate and pivot retainer on the bottom of front mounting bolt to a vertical position.
6. Grasp record changer and lift straight up and out of cabinet.
7. Remove 4 metal screws from bottom of cabinet.
8. Remove 2 wood screws from top of cabinet and remove amplifier.

FOR SERVICE INFORMATION ON RECORD CHANGER UNIT - SEE WEBSTER- CHICAGO MODEL 121- PHOTOFACT SET # 206 - FOLDER 12 OR RECORD CHANGER MANUAL CM-5

HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

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PARTS LIST AND DESCRIPTIONS

TUBES (SYLVANIA, GENERAL ELECTRIC, WESTINGHOUSE)

ITEM No.	USE	REPLACEMENT DATA		RETMA BASE TYPE	NOTES
		WEBCOR PART No.	STANDARD REPLACEMENT		
V1	Pre. Amp.	12AX7	12AX7	9A	
V2	AF Amplifier-Phase Inverter	12AT7	12AT7	9A	
V3	Output	6V6	6V6	7S	
V4	Output	6V6	6V6	7S	
V5	Rectifier	6X5	6X5	6S	

CAPACITORS

Capacity values given in the rating column are in mfd. for Electrolytic and Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	WEBCOR PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C1A	25	250		AFH4-14		D-005		FP444	TVL-4763	Red
B	20	250								Blue
C	20	250								Blue
D	15	250								Yellow
C2	.05	400		P488-05	DF-503	PTE4S5		PT415	4TM-S5	
C3	.02	400		P488-02	DD-203	PTE4S2		PT412	4TM-S2	
C4	10000			BPD-01	DD-103	5TM-S1	811-01	DC-511	5HK-S1	
C5	.0022	600		P688-0022	D6-222	PTE6D22	GP2-333-222	PT6222	6TM-D22	Note 1
C6	330			SI330	D6-331		GP2K-331	UC-5333	5GA-T33	
C7	1000			SI1000	D6-102	5TM-D1	GP2L-102	UC-521	5GA-D1	
C8	5000			BPD-005	DD-502	5TM-D5	812-005	D6-525	5HK-D5	
C9	.05	400		P488-05	DF-503	PTE4S5		PT415	4TM-S5	
C10	.05	400		P488-05	DF-503	PTE4S5		PT415	4TM-S5	
C11	2200			SI2200	D6-222	TM5D22	GP2-333-222	UC-5222	5GA-D22	
C12	.047	400		P488-047		PTE4S47		PT4147	4TM-S47	

Note 1. Some models may use an .05 @ 600V in this application.

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	WEBCOR PART No.	IRC PART No.	CLAROSTAT PART No.	CENTRALAB PART No.	MALLORY PART No.	
R1A	1 Meg	½	31P082	Q13-137	A47-1Meg-Z	BSK-70-S	U-53	Tone
B	Shaft		Not Req.	Not Req.	KSS-3	Not Req.	Not Req.	Attach to R1A
C	Switch		Not Req.	76-1	SWE-12	Not Req.	US-26	Attach to R1A
R2	500KΩ	½	31P085	Q18-137 XX			UDT289	Volume tapped @ 250K & 325K-Note

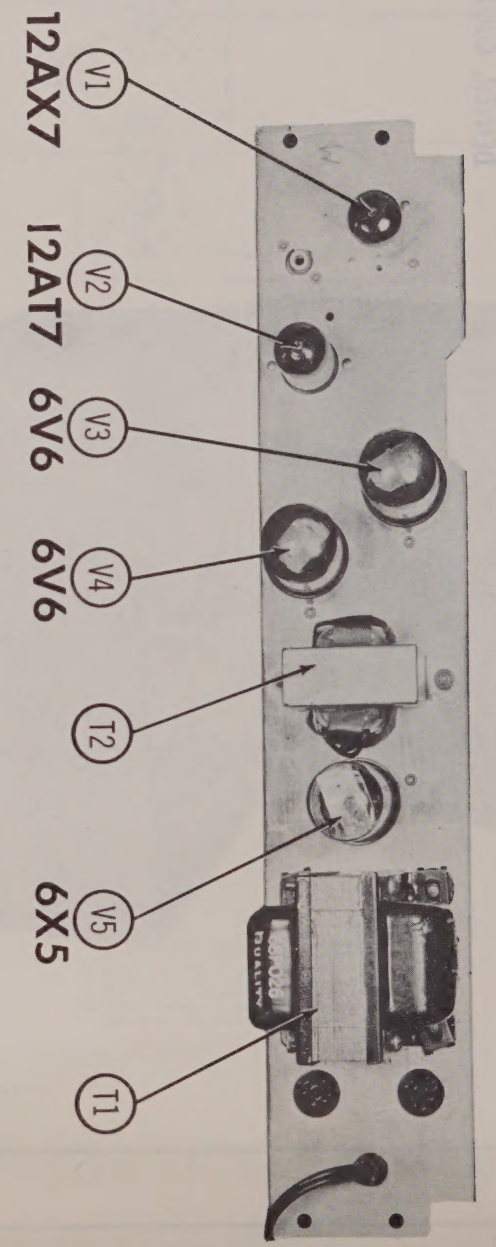
Note: Some models may use a 1 Meg control in this application.

RESISTORS

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	WEBCOR PART No.	IRC PART No.	
R3	10KΩ	½		BTS-10K	
R4	4.7Meg	½		BTS-4.7Meg	
R5	220Ω	½		BTS-220	
R6	150KΩ	½		BTS-150K	
R7	4.7Meg	½		BTS-4.7Meg	
R8	15Ω	1			
R9	15KΩ	½		BTS-15K	
R10	68KΩ	½		BTS-68K	
R11	10KΩ	½		BTS-10K	
R12	470Ω	½		BTS-470	
R13	820Ω	½		BTS-820	

ITEM No.	RATING		REPLACEMENT DATA		NOTES
	OHMS	WATT	WEBCOR PART No.	IRC PART No.	
R14	150KΩ	½		BTS-150K	
R15	150KΩ	½		BTS-150K	
R16	6800Ω	½		BTS-6800	
R17	220KΩ	½		BTS-220K	
R18	220KΩ	½		BTS-220K	
R19	220Ω	2		BTB-220	
R20	2200Ω	1		BTA-2200	
R21	68KΩ	½		BTS-68K	
R22	2200Ω	½		BTS-2200	
R23	15Ω	1			

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (POWER)

ITEM No.	RATING				REPLACEMENT DATA					
	PRI.	SEC. 1	SEC. 2	SEC. 3	WEBCOR PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Halldorson PART No.	Thordarson PART No.
T1	117VAC @ .31A	390VCT .052ADC	6.3VAC @ 2.5A		68P026	PC-8418①		P-9210 ①		

① Drill new mounting holes.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI. 1	SEC.	WEBCOR PART No.	Stancor PART No.	Merit PART No.	Triad PART No.	Halldorson PART No.	Thordarson PART No.	
T2	10KΩCT PRI. 2 17.2Ω DC (Center-tapped)	9.6Ω	67P036-1						

SPEAKER

ITEM No.	RATINGS			REPLACEMENT DATA			NOTES
	SIZE	FIELD	V. C. IMP.	WEBCOR PART No.	JENSEN PART No.	QUAM PART No.	
SP1	4"	PM	3.2Ω	76P028	ST-113 Mod. P4-X	4A1	
SP2	6"	PM	3.2Ω	76P029	ST-108 Mod. P6-X	6A1	
SP3	6"	PM	3.2Ω	76P030	ST-108 Mod. P6-X	6A1	

PHONO CARTRIDGE

ITEM No.	REPLACEMENT DATA							REMARKS
	WEBCOR PART No.	ASTATIC PART No.		SHURE PART No.		ELECTRO-VOICE PART No.		
		CARTRIDGE	NEEDLE	CARTRIDGE	NEEDLE	CARTRIDGE	NEEDLE	
M1								

PHONO NEEDLE

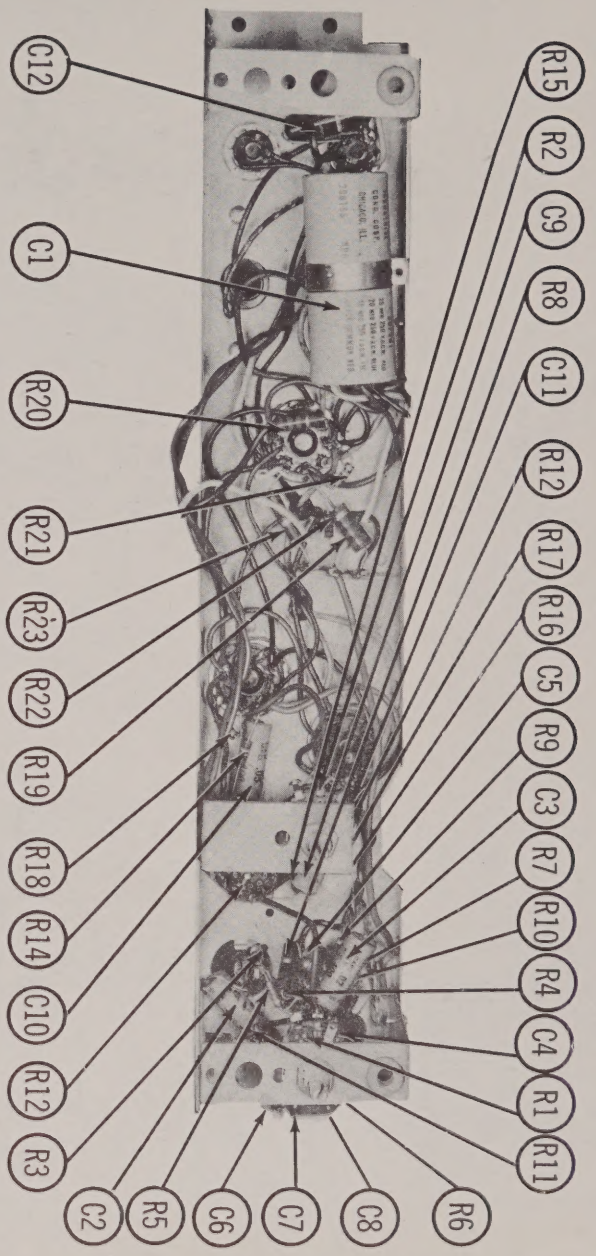
(FOR REPLACEMENT IN ORIGINAL EQUIPMENT CARTRIDGE)

ITEM No.	REPLACEMENT DATA				REMARKS
	WEBCOR PART No.	JENSEN PART No.	PERMO PART No.	WALCO PART No.	
M2		† GE-11	† AC-410 ♦† AC-410D1 ♦ AC-410D	† W-66TPS	† Jewel ♦ Diamond

MISCELLANEOUS

ITEM No.	PART NAME	WEBCOR PART No.	NOTES
M3	Dial light		# 47 bayonet

CHASSIS—BOTTOM VIEW



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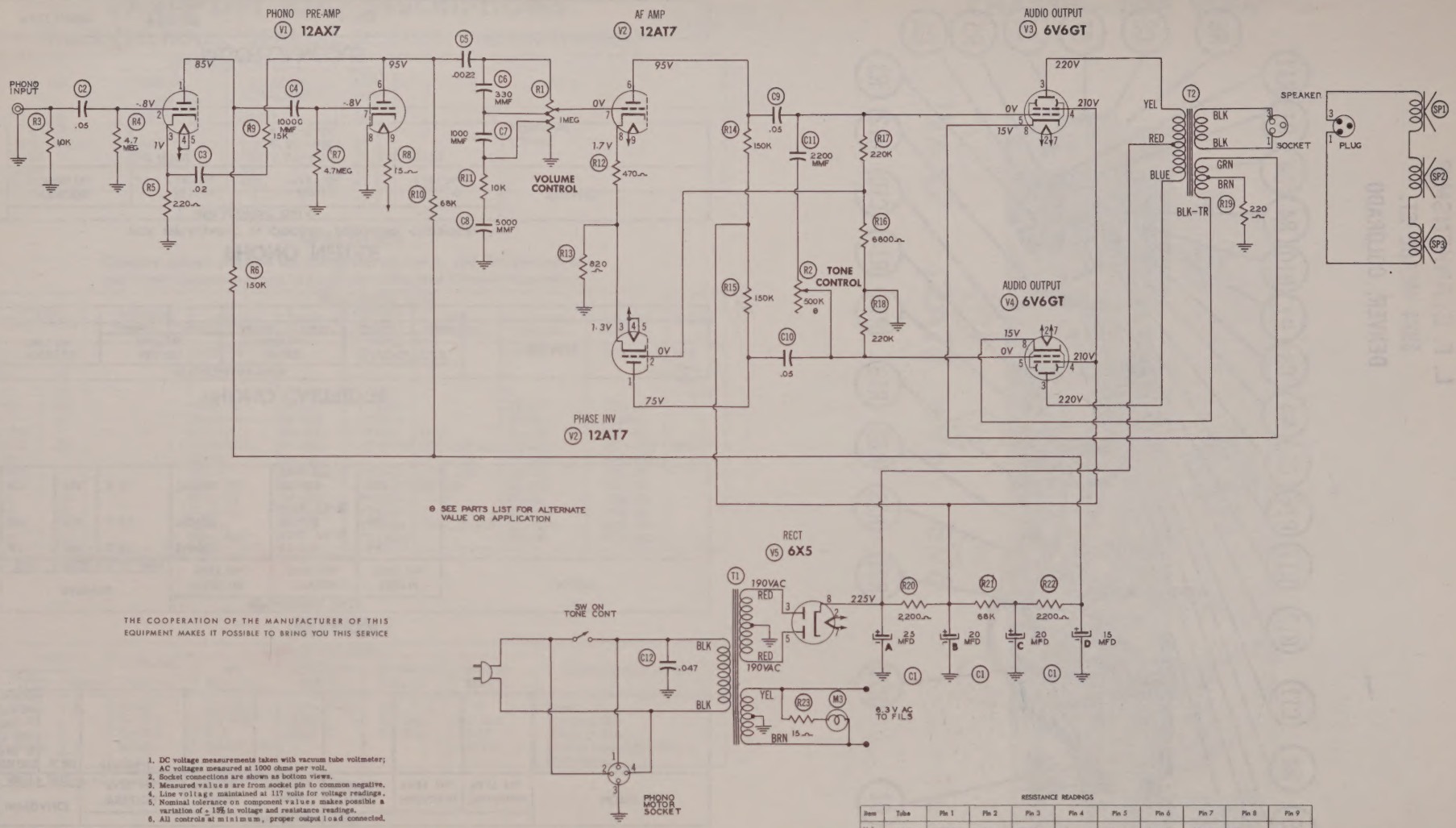

⊖ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

THE COOPERATION OF THE MANUFACTURER OF THIS EQUIPMENT MAKES IT POSSIBLE TO BRING YOU THIS SERVICE

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ± 15% in voltage and resistance readings.
6. All controls at minimum, proper output load connected.

RESISTANCE READINGS

Item	Tube	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V 1	12AX7	† 220KΩ	4. 7Meg	220Ω	5Ω	.1Ω	† 140KΩ	4. 7Meg	0Ω	.1Ω
V 2	12AT7	† 150KΩ	6. 8KΩ	820Ω	.1Ω	.1Ω	† 150KΩ	1 Meg	1. 3KΩ	.1Ω
V 3	6V6GT	0Ω	.1Ω	† 200	† 2. 2KΩ	290KΩ	INF	.1Ω	230Ω	
V 4	6V6GT	0Ω	.1Ω	† 170	† 2. 2KΩ	220KΩ	INF	.1Ω	230Ω	
V 5	6X5	0Ω	.1Ω	85Ω	† 2. 2KΩ	90Ω	† 70KΩ	.1Ω	600KΩ	

† MEASURED FROM PIN 8 OF V5.

A PHOTOFACT STANDARD NOTATION SCHEMATIC

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